Ontario. Committee on the Costs
of Education
        Brief No. lol, Appendix A-F

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# EDUCATIONAL RESEARCH PROPOSAL

## "A STUDY OF THE LEARNING PROCESS
## OF STUDENTS IN A LEARNER-CENTRED ENVIRONMENT"

by

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October, 1971

"A STUDY OF THE LEARNING PROCESS OF STUDENTS IN A LEARNER-CENTRED ENVIRONMENT".

1. Objectives and Design of Research Project and its Relevance to Education in Ontario

In several articles and reports [1,2,3,4] (copies enclosed in Appendix to the present proposal), the theory and the development work of a different approach to learning was described. Initially, this work was undertaken to meet the need of neophyte teachers taking summer training in preparation for two years' service overseas with Canadian University Service Overseas (CUSO).

Rather than the usual classroom, lecture-type approach, a centre was developed in which learning relied on the following factors or emphases:

(a) a collection of resource units of high quality and relevance to the needs of the learner.

(b) resource units consisting of a wide variety of media -- books, articles, videotapes, slides, slide-sound packs, sound tapes, films, artifacts, maps, photographs, speaker-telephone, overhead projector and resource people.

[1] North, S.L. and Forgie, D.G., "Development of a Pilot Model of a Learner-Centred Environment", February, 1970.

[2] North, S.L. and Forgie, D.G., "Multi-media Program Shows CUSO Volunteers a New Way to Learn", Can. University & College, Apr. 1970

[3] North, S.L. and Forgie, D.G., "Designing a Learner-Centred Environment", Continuous Learning Journal, Vol.10, No.3, May-June,1971.

[4] North, S.L. and Simpson, D.G., "A Note on the Development of a Learner-Centred Environment", May, 1971.

(c) the use of a shared-time computer system, accessed by remote teletype terminals, which the learner could use to explore a data base consisting of key-worded summaries of all the available resource units.

(d) the opportunity for the learner to determine what he wanted to learn, where to learn it, using whatever mix of media suited his own interests, and to match his own rate of learning, either on his own or through a group setting.

(e) providing an emphasis on developing an understanding of relationships between various areas of learning--the approach was clearly process-oriented and wholistic, rather than curriculum-determined and fragmented.

(f) making for a co-learning relationship between the "teacher" and "student".

A more detailed description of the resulting Learner Centre is contained in the articles and reports previously noted (see Appendix).

However, it is because of the factors or emphases described above, that the Learner Centre that has evolved over the past three years may be described as a <u>multi-media, computer-assisted, learner-centred approach and environment, making use of a co-learning opportunity for the learner and his resource teachers.</u>

Since the creation of the first model of the Learner Centre in 1969, the Centre has been used in the summer training of three orientation groups of CUSO volunteers totalling some four hundred and fifty persons, and recently some sixty Crossroads volunteers. During the academic years, the Centre has been used

by hundreds of students from Althouse College, other colleges and faculties of the University, as well as groups of teachers from the London and Hamilton Secondary Schools. A variety of other groups and individuals have used the Centre, and the Centre will be used almost continuously during the coming year by a variety of students and other groups from Althouse College, the University and educational and cultural groups from many parts of the province and beyond.

The reaction of all these various people has been strongly positive in that most learners found the experience ranging from workshops of one day, to five weeks in the case of large CUSO groups, to be a stimulating, exciting and useful one.

In 1971, Professors Milburn and Clarke, both from Althouse College, were able to utilize the principles and procedures developed in the CUSO-Althouse Learner-Centre, to create a similar resource concerned with social science curriculum theory. Currently, these men and others plan to develop a further data base for a learner-centred approach to Canadian Studies.

A modified version of the current CUSO-Althouse learner-centre (focusing on West and East Africa), is being created that emphasizes development work overseas and in Canada, to be used as a mobile public education learner centre by CUSO in the major cities of Canada commencing in late November for two weeks in Ottawa, and subsequently in Toronto and other centres from coast to coast through until June, 1972.

Essentially, therefore, what started as a flexible, individualized approach to a learning need for CUSO volunteers,

has shown itself to be of interest as an educational innovation to the wider university community. Members of university departments such as medicine, library science, law, geography, and computer science, have expressed interest in using systems based on the same principles and methods with their own students. In short, the user and potential user have tended to pronounce the Learner Centre to be "good" and "worth further development and extension".

The present proposal, however, is not designed to enlarge or extend the present Centre.

It seems possible that because the learner-centred environment referred to appears to permit a greater degree of individualized learning, utilizing a variety of approaches, where the student is less bound to a linear, sequential process, it may constitute a significant innovation attuned to the needs of education. Educational and social designers tell us our present educational system is outmoded, cumbersome, restricting, depersonalizing and irrelevant - the latter because it is geared to a view so oriented to the past that our graduates are archaic and antiquated almost as soon as they graduate. They stress the need to educate people who can grasp, understand and solve problems as wholes, across a variety of 'disciplines' especially as these problems relate to complex human issues involving international relations, population, poverty and ecology. Experts and laymen alike perceive the doom of spaceship Earth circa the year 2000. Without attempting to peer that far ahead,

it is clear that today and tomorrow, our educational system is
in trouble. Some critics berate the archaic methods we use in
view of the knowledge explosion, while others dismiss the content
of what we teach as unsatisfactory. Educational innovations in
method and in treatment of content are rather rare. Those
adopted uncritically and in the 'jump on the bandwagon' style
so typically North American (programmed learning, for example),
generally fall far below expectation and usually never actualize
their potential contribution.

The learner-centred approach created in recent
years in concert with Althouse College and the Office of
International Education of the University of Western Ontario
is one that has shown some promise as an educational innovation.
However, if this sort of approach does possess value as one means
of improving the learning environment in Ontario schools and
colleges, there is a critical need for carefully conducted
research into the questions: (1) does some significant, identifiable
learning take place in this type of learning environment - is it
similar to, different from, or complementary to more traditionally
learned knowledge, skills and attitudes? (2) how does the learner
learn in this novel sort of environment - is there an identifiable
pattern to this sort of learning, related, perhaps, to variables
such as personality, intelligence, previous education, socio-
economic level, and cultural orientation? (3) is the sort of
learning environment found in the learner-centred, multi-media,
rapid search and information-retrieval setting peculiarly suited
to learning certain kinds of contents and for certain kinds of

purposes? (4) how might the learner-centred approach best
be implemented and internalized in our present educational
institutions?

Research is needed to answer these sorts of
questions - user or learner enthusiasm is not a sufficient
condition for proposing this sort of learner-centred approach as a
serious supplement or alternative to some of the present learning
styles and systems.

The present investigators suspect that the sort of
approach developed through the CUSO-Althouse project may well
turn out to possess significant advantages for learning problem-
solving, and for creating a heightened social and cultural
awareness in handling information related to the social sciences
- one example of an area where problems of education, culture
and social issues cut across and require a synthesis of a variety
of 'subjects' or 'disciplines'. Should these suppositions turn
out to be verified to any demonstrable and significant extent
through the proposed research, the results could have significance
in areas such as the training of people in the helping or service
professions - medicine, law, teaching, social work, nursing,
psychology, community planning, etc. Additionally, the results
could have significance in extending the learner-centred approach
in educational settings, such as the universities and high
schools, or even the primary schools, not just as a new and
motivationally appropriate method, but as a means of bridging
the gap between learners and teachers.

The design of the proposed research involves U.W.O. students from the third or fourth year in the 'helping' professions - medicine, education, law, psychology-sociology-anthropology. Of all the 3rd and 4th year students in these faculties or departments, those for whom at least one of the following sorts of courses is a required or elective course would be identified:

| Course I | Course II | Course III | Course IV |
|---|---|---|---|
| Applied or Social Psychology | Sociology | Contemporary. Canadian History or Politics | Geography as a determinant of man's adjustment |

It would be most desirable to have a sample of these students distributed by college or faculty in the following manner:

|  |  |
|---|---|
| Medicine | (N=20) |
| Nursing | (N=20) |
| Education | (N=20) |
| Law | (N=20) |
| Psychology | (N=20) |
| Sociology or Anthropology | (N=20) |
| Geography | (N=20) |
|  | (N=140) |

These students, in total, would constitute the 'helping' professions' group. If it was possible to obtain the sort of sub-group samples shown above some sub-group analysis would be possible. So far as possible, equal percentages or proportions of the 'helping group' sample would take one of Courses I to IV

inclusive. The sample of 140 students would then be assigned at random, to a Control and an Experimental group. The Control group of 70 would take their courses (I, II, III or IV) in the normal or usual fashion. The Experimental group would take their "course" as an involvement in the Learner-Centre where a special data base and multi-media resource facility covering the content of Courses I, II, III, IV would be provided. Of the 70 Experimental group students, 17 would be assigned to cover their course under experimental condition A, 17 under condition B, 18 under C, and 18 under condition D.

Experimental Condition A would involve use of the Learner Centre as <u>individual</u> students.

Experimental Condition B would involve use of the Learner Centre as a <u>group</u> or "class".

Experimental Condition C would involve this group in a <u>human relations</u> training or a cultural awareness-producing group experience blended with their use of the Learner Centre.

Experimental Condition D would involve the group living together in a <u>residential</u> setting at Westminster College (in which the Learner-Centre is housed) where they would participate in the human relations training or cultural awareness experience blended with their use of the Learner Centre.

All the Experimental sub-groups would have had their "course" based on the Learner-Centre, while the Control group would not.

The design can be seen in total in the following diagram:

## SAMPLE OF STUDENTS MAJORING
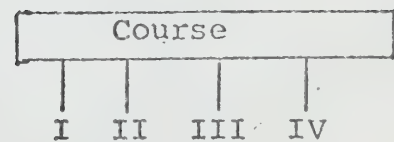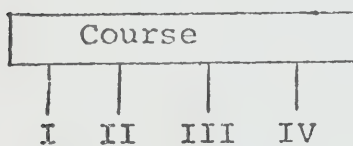## IN COURSES IN THE HELPING PROFESSIONS

N=140

|  | Control Group (N=70) | Experimental Group (N=70) |
|---|---|---|
| Source: | | |
| Medicine | 10 | 10 |
| Nursing | 10 | 10 |
| Education | 10 | 10 |
| Law | 10 | 10 |
| Psychology | 10 | 10 |
| Sociology or Anthropology | 10 | 10 |
| Geography | 10 | 10 |
| | 70 | 70 |

| Course |
|---|
| I   II   III   IV |

| Course |
|---|
| I   II   III   IV |

Method:  Courses taken in usual fashion in the University

Experimental Conditions

| | I | II | III | IV | | |
|---|---|---|---|---|---|---|
| A | 4 | 4 | 4 | 4 | = | 16 |
| B | 4 | 4 | 4 | 4 | = | 16 |
| C | 4 | 5 | 5 | 5 | = | 19 |
| D | 5 | 4 | 5 | 5 | = | 19 |
| | 17 | 17 | 18 | 18 | | |

In consultation with the university instructors
responsible for Courses I, II, III and IV, the research staff
for the project would work out:

1. The set of minimum, regular or usual assignments, tests
   and examinations requirements.

2. The additional set of problem-solving assignments such as
   research papers, seminars, oral examinations or simulations
   designed to test the more wholistic, relational, integrative
   abilities one would expect to be more characteristic of the
   Learner-Centre based students.  During the Learner-Centre phase
   of work with the Experimental Group, it is planned that
   faculty members from Course I, II, III and IV departments (other
   than those involved in teaching the Control Group) would have
   opportunity to serve as resource persons in the Learner Centre
   for the Experimental Group of Students.

Results would be interpreted not only through
comparison of the results of the Control and Experimental groups
by courses (I, II, III or IV), but also on an overall achievement
basis in terms of problem-solving abilities.  While the sub-
groups of the Experimental Groups under the several conditions
(A, B, C and D) would be small, some analysis of the variance
would be possible so as to indicate which of the several conditions
enhanced or diminished the Learner-Centre effect.

Determination of the direction and nature of the
learner centre learning process would be made not only from
observational methods by the research staff, but also, from a
tracking system, using the computer to determine which questions,

approaches and media are used in the learning process.

In addition to developing data and materials for the four course content, it is hoped the project could utilize many aspects of the present CUSO-Althouse system, and, have access to the data base on social science theory, and the data base on Canadian Problems currently planned by Professor Milburn and Professor Clarke of Althouse College.

The results that hypothesis would lead us to expect, would be the following:

1. Using university course assignments, tests and examinations as performance criteria, the Control and Experimental groups should be equal or similar in their achievement.

2. Using measures (research papers, seminar performance, simulation exercises, tests of creative thinking) designed to assess the degree to which learning results in a more wholistic, related achievement reflected in increased problem-solving, the Experimental group would show significantly superior performance.

3. There would be a positive correlation between the degree of creative, problem-solving ability and the Experimental groups' participation in the Learner Centre as individuals, as groups, as groups where human relations training optimized Learner Centre involvement and as groups where living together in the residence optimized human relations and Learner-Centre education. Similarly, the differences in creative problem-solving achievement between the Experimental and Control groups should be more pronounced for the Experimental groups, that is, most significant for the residential and less significant for the individual use of the Learner Centre.

4. One is tempted to deduce a further prediction, namely that the final grade average for <u>all</u> university courses taken by the Experimental students would be significantly higher than that for the Control group. This relationship would be more marked in the case of the residential and less marked (but significant) for the individual learning group.

In assessing performance differences between groups, mean and/or median scores will be used, with statistical analysis of significance of differences required to meet the 5% level of confidence in testing any of the hypotheses.

## 2. Duration of Proposed Research

The Research is conceived of as consisting of two stages:

(a) Preparatory Stage:  January 1, 1972 to September 1, 1972.

During this stage, the design and methods would be finalized with the faculty members of Courses I, II, III and IV, and arrangements made for the identification and random selection of the Control and Experimental groups. Further arrangements, other than the avoidance of the creation of a group under Experimental Condition A., would be necessary to work out with faculty members to control for the well-known "Hawthorne Effect" in this sort of study.

During this period too, the data base and all Learner Centre materials of a multi-media sort would have to be developed, summarized and keyworded into the computer system.

Target date for these latter steps would be June 30, 1972.

(b) Experimental Stage: September 1, 1972 to April 30, 1973.

The research project would consist chiefly of the academic year 1972-1973. Subsequently, some added time would be needed for final analysis of data and proper reporting of results, with target date for the latter as September 1, 1973.

## 3. Details of Financial Support and Budget

### Multi-media materials and equipment:

| | Jan.1/72 to June 30/72 $ | July 1/72 to Apr.30/73 $ |
|---|---|---|
| Books – 500 at average $8.00 | 4,000 | – |
| Video-tapes – 60 at $40 | 2,400 | – |
| Slides and Audio-tapes | 1,200 | – |
| Films – purchase and/or rental (30) | 3,000 | – |
| Articles, illustrations, file material approximately 20,000 pages | 1,500 | – |
| File folders, clerical supplies | 250 | 100 |
| Maps, charts, diagrams | 100 | 50 |
| Supplementary audio-visual equipment | 2,000 | 2,000 |
| Computer and Terminal Rental (estimate 4 hrs/day over 8 months) | – | 13,824 |
| Development of computer programmes by Comshare personnel | 5,000 | 1,000 |
| Key punching costs (7000 items) | 1,700 | 400 |
| Research data analysis – computer costs | – | 3,000 |

Staff – to carry out design refinement, project direction, data collection and analysis; preparation of all multi-media materials for computer input, operation of Centre on six day per week basis

| | Jan.1/72 to June 30/72 $ | July 1/72 to Apr.30/73 $ |
|---|---|---|
| (a) Research assistant – librarian | 4,000 | 8,000 |
| (b) Graduate student assistants re course content – four part-time Jan.1/72 – June 30/72 | 4,800 | – |
| (c) Graduate student assistants – resource personnel – four part-time Sept. 1/72 – Apr. 30/73 | – | 6,400 |
| (d) Human relations trainers – three staff for total of two months during Sept. 1/72 to Apr. 30/73 | – | 8,600 |

14.

## Staff (cont'd)

| | Jan.1/72 to June 30/72 $ | July 1/72 to Apr.30/73 $ |
|---|---|---|
| (e) Research director and co-ordinator Jan 1/72 – Apr.30/73 (part-time) | 4,500 | 9,000 |
| (f) Centre staff to operate all facilities and work with students – part time July 1/72 to Aug. 31/72 to receive training and test out the functioning of all components; full time on a six day/week basis Sept. 1/72 – Apr.30/73 | 2,400 | 9,600 |
| (g) Secretarial assistance part time – Jan.1/72 – Apr. 30/73 | 1,250 | 2,500 |
| Supplementary furniture, bookcases, A/V storage units | – | 600 |
| | $38,100 | $65,074 |
| PROJECT TOTAL: | | $103,174 |

## 4. Curriculum vitae of the principal investigator

S. L. NORTH – 47, Canadian citizen; graduate London Teachers' College 1941; R.C.A.F. 1943-5; graduate honour Psychology and Philosophy (Gold Medalist) U.W.O. 1949; M.A. Psychology U.W.O. 1950; doctoral training and research in Psychology U.W.O. and University of Michigan while Research Training Fellow S.S.R.C. Washington, D.C.; Ph.D. Psychology 1953.

Chief Psychologist St. Thomas Psychiatric Hospital 1952-6; 1956 to 1971 private practice in clinical and research psychology, including part-time instructor in psychology University of Toronto, McMaster University; associate member medical staff Joseph Brant Hospital, Burlington, consultant in psychology to C.U.S.O. and Canadian Crossroads International; associated in projects with Office of International Education, U.W.O.; six publications in psychology and education fields. Special interests -- perception, inter-cultural psychology, human relations training and learner-centred research.

## 5. Names and signatures of investigators:

(a)  Principal Investigator:

_____

S. L. North,
Research Associate,
Office of International Education,
University of Western Ontario.

(b)  Associate Investigator:

_____

D. G. Simpson,
Director,
Office of International Education,
University of Western Ontario.

# APPENDIX

Reference list of articles and reports
concerning work on the CUSO-Althouse
Learner-Centre, 1969 - 1971.

ONTARIO DEPARTMENT OF EDUCATION

GRANTS-IN-AID OF EDUCATIONAL RESEARCH 1972-73

RESEARCH PROPOSAL RE:

"LEARNER-CENTRED ENVIRONMENT AS AN ALTERNATIVE
RESPONSE TO CURRENT EDUCATIONAL NEEDS".

Principal Investigator:                    S. L. North, Ph.D.

Setting:            University of Western Ontario and
                    London Board of Education.

Amount of Funding Requested:              $44,000.00

Foci of Proposal:    Learning Methodology Curriculum

<u>"LEARNER-CENTRED ENVIRONMENT AS AN ALTERNATIVE
RESPONSE TO CURRENT EDUCATIONAL NEEDS".</u>


<u>INTRODUCTION & BACKGROUND TO RESEARCH PROPOSAL:</u>


Recent years have seen increasing expressions
of concern about, and dissatisfaction with the current
status of the educational process.  In Ontario, and specifically
the London community, many secondary school students, teachers,
parents and employers have expressed their concern and dis-
satisfaction, as have people throughout Canada and the United
States.  The specific nature of these concerns and dis-
satisfactions have been set out in detail both in academic
writings such as those of Roszak, Kenniston and Yankelovich,
reflected in the work of contemporary philosophers such as
Heidegger and Whitehead, and described in the popular press.
In particular, an increasing number of secondary school students
seem to perceive their school environments as dehumanized,
uninteresting, irrelevant, artificial and unnatural.

Increasingly, certain life-style themes and their
associated social values are turning up in "ordinary" groups
of adults and students to bedevil school administrators and
school board members.  Yankelovich has described these life-
style themes and values fully in his very recent book.[1]
In greatly reduced summary form, we say that Yankelovich notes
the stress on naturalism, meaning: not competition and survival
of the fittest, but stress on the interdependence of all the
phenomena of nature; giving greater priority to sensory
experience, rather than conceptual knowledge; attempting to
live close to nature - "off the land" where possible; living
and working in groups based on need and interest not artificial
criteria such as the alphabetical beginning of one's last name;
de-emphasizing science-illuminated aspects of nature and stressing
the unknown, mystic, mysterious elements of nature; stressing
co-operation instead of competition; living in the here-and-now
of existence or being, rather than in a future orientation or in
planning; emphasizing direct experience, participation and
involvement as ways to arrive at truth rather than through
scientific detachment, objectivity and non-involvement; to look
and feel natural hence rejection of artificial styles in clothes
and appearance; to reject official and artificial forms of
authority - authority is earned not automatically inherent in a
title; stressing adaptation to rather than striving for mastery
over nature - analagous to the non-disturbing windmill rather
than the destructive bulldozer; gross de-emphasis on formal

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1. Yankelovich, D., "The Changing Values on Campus", Simon
   and Shuster, New York, April, 1972.

organization, rationalization and cost-effectiveness or other aspects of "McNamarism" and a focusing on the community rather than self-centred individualism, self-reliance and achievement.

Students and teachers who try to bring some measure of these elements of a naturalistic life-style into school life see more compassion, humanism, responsiveness and feeling becoming part of the repertoire of the graduate. At any rate, much about our present secondary school system seems to ignore these less intellectual, organized or objective needs of students, or if aware of them, seems unable to respond to them in practical, effective ways.

Similarly, where subject curricula have been enriched and much more choice left to the student as to what to use and study, there is often, not a lack of material, but a bewildering mass of too much or a lack of a means of selecting among resources. As an illustration -- the present secondary school English programme gives the student a choice among some sixteen hundred books. When curricula are "opened up" and more emphasis placed on seminars, projects and other individual or group student activity, often the student is submerged by a mass of data through which he cannot find his way using conventional library indexes or guides. In addition, study of topics that cut across a number of subject areas is often made very difficult because there is no way of obtaining interrelated data in a convenient, effective manner.

Alternatives to much of what is traditional and current in secondary education, may well involve significantly different changes in the method of learning and in the nature or kind of learning process. The present proposal concerns an approach along these lines that tries to respond to the changing life style needs of the student and provides a method based upon the use of a learner-centre that provides a fast search and retrieval capability.

DESCRIPTION OF DEVELOPMENT AND USE OF A LEARNER-CENTRED ENVIRONMENT APPLICABLE TO SECONDARY SCHOOL NEEDS.

In several articles and reports [1,2,3,4] (copies

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enclosed in Appendix to the present proposal), the theory and
the development work of a different approach to learning was describe
Initially, this work was undertaken to meet the need of neophyte
teachers taking summer training in preparation for two years'
service overseas with Canadian University Service Overseas (CUSO).

Rather than the usual classroom, lecture-type approach,
a centre was developed in which learning relied on the following
factors or emphases:

(a)  a collection of resource units of high quality and relevance
     to the needs of the learner.

(b)  resource units consisting of a wide variety of media - books,
     articles, videotapes, slides, slide-sound packs, sound
     tapes, films, artifacts, maps, photographs, speaker-telephone,
     overhead projector and resource people.

(c)  the use of a shared-time computer system, accessed by
     remote teletype terminals, which the learner could use
     to explore a data base consisting of key-worded summaries
     of all the available resource units.

(d)  the opportunity for the learner to determine what he wanted
     to learn, where to learn it, using whatever mix of media
     suited his own interests, and to match his own rate of
     learning, either on his own or through a group setting.

(e)  providing an emphasis on developing an understanding of
     relationships between various areas of learning - the
     approach was clearly process-oriented and wholistic,
     rather than curriculum-determined and fragmented.

(f)  making for a co-learning relationships between the "teacher"
     and "student".

A more detailed description of the resulting Learner
Centre is contained in the articles and reports previously
noted (see Appendix).

However, it is because of the factors or emphases
described above, that the Learner-Centre that has evolved over
the past three years may be described as a multi-media, computer-
assisted, learner-centred approach and environment, making use of
a co-learning opportunity for the learner and his resource
teachers.

Since the creation of the first model of the Learner
Centre in 1969, the Centre has been used in the summer training
of three orientation groups of CUSO volunteers totalling some
four hundred and fifty persons, and recently some sixty Crossroads
volunteers.  During the academic years, the Centre has been used

by hundreds of students from Althouse College, other colleges and faculties of the University, as well as groups of teachers from the London and Hamilton Secondary Schools. A variety of other groups and individuals have used the Centre, and the Centre will be used almost continuously during the coming year by a variety of students and other groups from Althouse College, the University and educational and cultural groups from many parts of the province and beyond.

The reaction of all these various people has been strongly positive in that most learners found the experience ranging from workshops of one day, to five weeks in the case of large CUSO groups, to be a stimulating, exciting and useful one.

In 1971, Professors Milburn and Clarke, both from Althouse College, were able to utilize the principles and procedures developed in the CUSO-Althouse Learner-Centre, to create a similar resource concerned with social science curriculum theory. Currently, these men and others plan to develop a further data base for a learner-centred approach to Canadian Studies.

A modified version of the current CUSO-Althouse learner-centre (focusing on West and East Africa), is being created that emphasizes development work overseas and in Canada, to be used as a mobile public education learner centre by CUSO in the major cities of Canada commencing in late November for two weeks in Ottawa, and subsequently in Toronto and other centres from coast to coast through until June, 1972.

Essentially, therefore, what started as a flexible, individualized approach to a learning need for CUSO volunteers, has shown itself to be of interest as an educational innovation to the wider university community. Members of university departments such as medicine, library science, law, geography, and computer science, have expressed interest in using systems based on the same principles and methods with their own students. In short, the user and potential user have tended to pronounce the Learner Centre to be "good" and "worth further development and extension".

SPECIFIC PROPOSAL FOR THE LONDON SECONDARY SCHOOLS:

From the foregoing outline of the changing needs and "life styles" of students and of the learner-centred approach developed through the Office of International Education at U.W.O., it seems worthwhile to consider creating a learner-centred environment in and as an alternative to present secondary school programmes.

The London Board of Education has had a continuing interest and involvement in the development and use of the Learner-Centre. The essence of the present proposal is to make available the present resources of the Learner-Centre at Westminster College of U.W.O., or its companion Mobile Learner Centre that is currently on a coast-to-coast tour of major cities, to serve as the already developed nucleus of a centre for the secondary schools in London.

The necessary expertise and expertise with learner-centred studies is available, as are also much of the audio-visual equipment and hardware, some of the needed resource people, and, in particular a fully developed computer programming package plus the terminals and large-scale computer system needed to mount, store and retrieve data. The present content of the system focuses on Canadian social science information, cross-cultural materials involving Africa, Canadian native and black studies and resources to do with international education and development.

The research or development proposed would be in the nature of a three stage, action research programme - stages one and two are the subjects or concerns for the present grant submission:

Stage One: Involvement of Students, Teachers, Administrators and Parents in determining whether the present Learner-Centre is a model worth pursuing for use in the London Secondary Schools. Specifically, this would involve setting up the present mobile learner centre in one of the London secondary schools. Here, the Centre would constitute a visible demonstration of what can be done. Students, teachers, administrators and parents would have full access to it and through discussion groups, develop ideas about how such a centre might be used in the school, what they would like it to contain with respect to content and how they would like to be involved in its development.

During this stage, conducted in part to avoid having something developed and imposed from without by outsiders, and, in part to ensure that the people from or associated with the school can make it "theirs" by their input and involvement, there could also be some "practical" use of the centre as part of the academic life of the school. Without adding new data or resources, it is reasonable to state that the present centre would be helpful to students and teachers with some topics in some courses in geography, history, comparative literature, current events, Canadian social issues, Canada's role in the world to do with trade, economics, cultural relations, and topics in the "Man in Society" course that have to do with family life

through the introduction of concepts in sociology. In
addition, the Centre, as part of the school scene, would bring
a new dimension to the attempts of students and teachers to
see their course content in a wider world context. Biology
courses, for example, would find a rich source of data related
to bacterial disease, genetic disorders and the population
crisis. Data from the present content of the Centre are
available that would make possible life-like use of
illustrations of basic mathematical procedures, or data for
relating to experiments in chemistry. Courses in computer
science could use the Centre as an operating example of an
highly sophisticated programming and computer system. In
particular, students, teachers, administrators and parents
could have a first-hand experience of learning in a learner-
centred, multi-media, computer-assisted centre that relied
upon key resource people or teachers-as-guides-and-participants-
in-learning. In addition, this stage would bring students,
teachers, administrators, Board members, parents and researchers
from Western's Office of International Education together in
an informal, but intense opportunity for learning and critical
evaluation. This first stage is planned as commencing in
September, 1972 and terminating at the end of November, 1972.

        Stage Two:  Development of a Learner-Centre with
content specifically designed for the needs of the London
Secondary Schools.

        During and after Stage One, a more specific
picture of what is needed and wanted in the way of a learner-
centred facility would be developed. While this cannot be
exactly specified at present, some of the major, likely
alternatives can be, and these would include the following:

1.  Retention of some of the present data [1] and use of the
    Centre as an adjunct to the library and as a resource
    centre for use by students and teachers.

2.  Development of specific, new data related to one or more
    of the secondary school courses through the participation
    and involvement of teachers and students, and, the use of
    the thereby modified Centre as the learning environment for
    that course or those courses. With some students taking
    the course via the normal classroom route, and some taking
    it via the Learner Centre, comparisons of how and what is
    learned would be possible.

1.  At present, this involves some seven thousand resource
    items - books, articles, artifacts, audio-visual materials.

Courses in English literature, history, geography,
foreign languages are readily conceivable as being
"taught" via a Learner-Centre.  It is also probable that
courses in mathematics and science could be similarly
"taught", particularly when one bears in mind that
presently qualified teachers on staff would "teach" in
the Learner-Centre following training sessions in how to
utilize this new sort of learning environment.  In some
instances, the course or courses concerned might be
taken through a combination of present, usual classroom
methods and the Learner Centre.  In the latter case, the
Centre may well constitute an extension or reinforcement
of the classroom.

3.  Development of a multi-disciplinary or multi-subject
resource content.  Here there would be a rich opportunity
for seeing how subjects tie together or relate, particularly
in solving problems broader than any one discipline.  Not
only would this make much of the learning more meaningful,
wholistic and relevant, but also afford an opportunity to
learn to solve problems.  Problem solving is a pattern of
skills most students do not learn, busy as they are at
knowledge and basic skill acquiring within each of a
number of educational slots or pigeon-holes.

4.  Development of resources and use of the Centre as a centre
for learning based on interest and need.  Further, such
a Centre could become a Centre for the learning and
participation by families - students and parents, together
with teachers learning together, either about school subjects,
or more particularly about applying educational resources to
community problems - area planning, social problems,
ecological issues, etc.  A development of this sort would
help to blend the school and the community and facilitate
communication between students, parents, teachers, educators
and municipal legislators on educational matters.

During Stage Two, which the present proposal
perceives as commencing by December 1, 1972 and continuing on
through June, 1973, continual review, modification and change
would be necessary.  A full scale development during that time
could reasonably be expected to have reached a critical testing
out stage on one of the foregoing alternatives: - 1, at least
one course of 2, a real start on 3 or 4.  Stage Three, which
could well involve full development of all these alternatives
could well take several years beyond Stage Two.  Beyond June,
1973, Stage Two would continue through to the end of August,
1973, concerned with participation of students, teachers,
parents, administrators and the principal researchers in an
evaluation of the work to date, further testing out of ideas and

procedures with students, and as much development in the direction of the alternatives mentioned above (or the others that will emerge) as time and resources permit. Throughout the research, especially in Stage Two, constant attempts at evaluation will be made to ensure the Centre does meet the needs of students and teachers, and as well, to use accepted educational and social science techniques of studying the learning processes involved.

Clearly, the exact form of the proposed research depends upon what the students, teachers and others consider with the researchers to be needed and relevant. However, the general purpose or principle is that of working to see whether, how and in what form, the changing life style and educational needs of students can be met by a learner-centred approach of the sort exemplified by the Learner-Centre at the university. Specific designs of research, aimed at study of the learner-centred approach in one high school would be determined as the role and content of such a centre became clear in Stage One and became the substance of Stage Two. Where applicable, comparison of results with control or criterion groups would be undertaken. Measures of results would include evaluations or grades on the present course evaluation basis - assignments, tests, examinations, etc., as well as including determination of the attitudes and need-satisfactions of the students and teachers using the centre.

Ideally, if all the alternatives stated on pages 6 and 7 of this proposal were fully realized successfully, the secondary school learner-centre could be utilized as a training environment for teachers and the system extended and made available throughout the London secondary school system. The achievement of Stages One and Two of the project hold out promise of significant beginnings of a worthwhile and relevant alternative response to current educational needs in Ontario.

FINANCIAL SUPPORT AND BUDGET:

In Stages One and Two of the research, the development of a learner-centre in a London secondary school would take advantage of the considerable work done by the Office of International Education of the University of Western Ontario, with principal support from C.U.S.O., in creating the existing Learner-Centre and its mobile counterpart. Approximately one hundred thousand dollars has been involved in developing these facilities, exclusive of equipment and resource materials amounting to some ninety thousand dollars.

During the two stages of the proposed project, the mobile Learner-Centre, complete with its audio-visual equipment, multi-media resources, computer programmes and computer terminal equipment, to a value of some seventy thousand dollars would be available on a cost and maintenance non-profit rental basis.

In addition, the other major costs would involve those for computer usage based on a flat rate for an estimated block of time extending over the period September 1, 1972 to September 1, 1973. The flat rate made available to the Office by Comshare Corporation Limited has been much below commercial rates and could be expected to be of similar size during the proposed research. Another significant cost would concern staff. One full time teacher from the London Board of Education staff would be needed, with that salary paid in the usual manner by the Board. Research staff consisting of the principal investigator and two development and operations resource staff leaders would be supported through the present requested grant-in-aid-funds.

During Stage Two, specific new content related to the course needs of students would need to be identified, collected, prepared for storage and retrieval in the computer data base - an estimated $20,000 would be required.

The details of the needed financial support are shown in the enclosed budget (see page 10). Of the total amount of $60,700, the London Board would be able to find $16,700 out of its present budget, and the remaining $44,000. would be the amount requested as a grant-in-aid.

Please note: underlined items requested from grant-in-aid; items not underlined provided from normal budget of London Board of Education.

| CLASSIFICATION | ITEM | RELATIONSHIP TO ACTIVITY WITHIN PROJECT | UNIT COST | TOTAL COST |
|---|---|---|---|---|
| 1. PERSONNEL | 1. Secondary School Teacher | Member research & development team | 100% of time for 12 months | $9,500. |
| | 2. Principal Investigator | Design, co-ordinate, analyze, report find-ings. | 30% of time for 12 months | $7,000. |
| | 3. Research assistants & operations staff (two). | Assist in operations & development work | 100% of time for 12 months | $14,000. |
| | 4. Clerical assistant. | Carry out needed secretarial, filing work. | 50% of time for 12 months | $3,000. |
| 2. SUPPLIES AND MATERIALS | 1. Rent for CUSO Mobile Learner Centre | Developed multi-media & computer programme package to support project. | Rent for one year | $4,200. |
| | 2. New Data base | New content for use with secondary school | Purchase, creation or copying costs during one year - assume 2000 items @ $7.50 | $15,000 |

| CLASSIFICATION | ITEM | RELATIONSHIP TO ACTIVITY WITHIN PROJECT | UNIT COST | TOTAL COST |
|---|---|---|---|---|
| DATA PROCESSING | On-line computer retrieval capability linking London & Toronto with Comshare Limited Sigma 7 computer | Serve as retrieval capability for multi media centre; also used to record data as to use of centre | Block of 400 hours expected time during 1 year period @ $20.00 per hour. | $8,000. |
| TRAVEL | None of significance aniticipated | | | |

TOTAL COST - LONDON BOARD     $16,700.00

TOTAL COST - GRANT-IN-AID     $44,000.00

TOTAL COST OF PROJECT     $60,700.00

CURRICULUM VITAE OF THE PRINCIPAL INVESTIGATOR

S. L. NORTH - 47, Canadian citizen; graduate London Teachers'
College 1941; R. C. A. F. 1943-5; graduate honour Psychology
and Philosophy (Gold Medalist) U.W.O. 1949; M.A. Psychology
U.W.O. 1950; doctoral training and research in Psychology
U.W.O. and University of Michigan while Research Training
Fellow S.S.R.C. Washington, D.C.;  Ph.D. Psychology 1953.

Chief Psychologist St. Thomas Psychiatric Hospital 1952-6;
1956 to 1971 private practice in clinical and research
psychology, including part-time instructor in psychology
University of Toronto, McMaster University; associate member
medical staff Joseph Brant Hospital, Burlington, consultant
in psychology to C.U.S.O. and Canadian Crossroads International;
associated in projects with Office of International Education,
U.W.O.; six publications in psychology and education fields.
Special interests - perception, inter-cultural psychology,
human relations training and learner-centred research.

NAME AND SIGNATURE OF INVESTIGATOR:


        Principal Investigator:



        _____

                                        S. L. North,
                                        Research Associate,
                                        Office of International Educati
                                        University of Western Ontario.

## APPENDIX

Reference list of articles and reports
concerning work on the CUSO-Althouse
Learner-Centre, 1969 - 1971.

# DEVELOPMENT OF A PILOT MODEL OF A LEARNER-CENTRED ENVIRONMENT

S. L. North   and   D. J. Forgie

1970

A project carried out for the
Althouse College of Education
C.U.S.O. West Africa Orientation
Programme in the summer of 1969
at LONDON, Ontario.

DEVELOPMENT OF A PILOT MODEL OF A LEARNER-CENTRED ENVIRONMENT

S. L. North and D. J. Forgie

1970

## CONTENTS

# DEVELOPMENT OF A PILOT MODEL OF A LEARNER - CENTRED ENVIRONMENT

by

S. L. North, Ph.D.[1], and D.J. Forgie, M.Comm.[2]

## 1. THE INTRODUCTION

Canadian University Services Overseas (CUSO) is a private organization that sends Canadians to many of the developing nations of the world. In its West Africa programme in 1968, CUSO sent one hundred and thirty-five volunteers to Sierra Leone, Ghana, and Nigeria. Of this group, over one hundred were teachers or teacher trainers, while the remainder were physicians, nurses, medical technicians, agriculturalists, foresters or community development personnel. The majority of these volunteers were recent graduates from Canadian undergraduate university programmes and were professionally inexperienced. In preparation for their two years of overseas work, the volunteers spent six weeks in an orientation course in London, Ontario, during the summer months of 1968. The orientation course was conducted under the direction of staff from Althouse College of Education, University of Western Ontario and included other staff personnel, both Africans and non-Africans, from other centres. Approximately one third of the time was devoted to teacher training and practice teaching; lesser amounts of time were concerned with language training, study of West African History, geography, economics and politics,

[1]. Nathaniel Hughson Institute, Burlington, Ontario.

[2]. School of Library Science, University of Toronto, Ontario

and, with a variety of topics having to do with preparing to
live and adapt to a different culture.  Of necessity, because
of large numbers and limited time, much of the orientation
training was conducted by the lecture and discussion method
and involved rather large groups scheduled in a timetable
fashion.  Traditional library resources were also available.

In a post-orientation critical evaluation of the orient-
ation programme, it became apparent that the programme was not
meeting some of the needs of the volunteers for the overseas
settings in several important respects:

1.  volunteers differed considerably in previous preparation,
    aptitude and modes of learning;

2.  overseas assignments differed widely and constituted
    different demands upon the resources of the volunteers;

3.  the overseas assignments usually involved individual learning
    and adaption, while the orientation tended to group,
    standardized learning.

As in most positive learning environments, staff
members were keen to foster individualized learning, but large
numbers, great variety in assignment settings, sizeable amounts
of material to be learned and severe limitations of time had
prevented much individualized, volunteer-determined or
learner-centred emphasis.

II PROPOSED LEARNER-CENTRED DEVELOPMENT

One possible development to supplement the 1969 orientation

programme was suggested, namely, the creation of a facility that
would make for individualized learning. Previously, in the
summer of 1968, an information or resource centre had been
designed and used at the orientation for Crossroads Africa[3], and
experience with this flexible, manual way of making individualized
learning possible, encouraged CUSO to consider a more sophisticated
approach, utilizing newer information technologies. Such a
facility was envisioned as consisting of a multi-media, computer
assisted, information-retrieval and problem-solving centre. It
was reasoned that it should be possible to store information
concerning some significant area of knowledge in the memory of
a computer, gain rapid access to this information through the
use of a teletype terminal remoted to a time-sharing computer by
telephone line, and use the resulting print-out as a guide to a
variety of multi-media sources relevant to the volunteer's
interest. If, for example, the volunteer asked a question about
the geography of Nigeria, the terminal operator would enter the
key words relevant to the question, and through the terminal, the
computer would print out a list of the information available in
the centre bearing on the question, along with indications as to
the medium to be used in obtaining the answer. A question about
the desert region of Northern Nigeria could, therefore, be expected

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[3.] A North American volunteer organization that sends teams to
African countries, chiefly to carry out summer work camp or
construction projects.

to produce a computer listing that gave the volunteer the choice
of the form in which the answer would be received, including
viewing a map on an overhead projector, seeing part of a colour
sound movie, operating a slide-sound system, reading a selected
chapter of a book, listening to an audio tape, discussing his
question with an expert located at the centre or contacting
that expert by means of a speaker telephone, or viewing
several video-tapes. Essentially a learning environment of
this type would attempt to provide a service to the learner
similar to that of the librarian in a small town library who
knew what was in every book and had the knack of being able to
interrelate all the separate items of information in response to
any question posed to her.

In making the suggestion for such a learning centre, it
was also emphasized that the material used would need to be very
carefully selected, and be pertinent and of high quality. After
much discussion, the decision was taken to attempt to develop
a demonstration model of a multi-media, learner-centred environ-
ment to be available by the summer of 1969. If this miniature
pilot model appeared to possess substantial advantages to the
learner, then consideration was to be given to expansion to an
enlarged operational system for the 1970 orientation.

Interest in the pilot project for the summer of 1969
was not primarily in the instructional aids, equipment and
technology. Rather, the focus was on the learning process of

the individual volunteer. In pursuing this interest from a
learner-centred, rather than a staff-centred approach, some new
techniques would be involved in the utilization of multi-media
and other library resources. The School of Library Science,
University of Toronto was involved in bringing some of the newer
technology to bear upon its own programmes and in the creation
of its new media centre. Accordingly, the School welcomed the
opportunity to work with CUSO in developing the proposed
demonstration model, and throughout the project made all of its
media facilities and equipment available.

III SELECTION OF INFORMATION

    Late in 1968, work commenced on the first (and what
subsequently proved to be the most difficult) problem--the ident-
ification of the specific area of content to include in the demon-
stration model, and, the selection and preparation of the
materials for that content area. A small committee of CUSO orient-
ation personnel, the director of the West Africa programme and
the present researchers believed that the content area most mean-
ingful and useful to the volunteers (apart from professional
training in teaching or some other skill) should include the
geography, history, economics and cultural background of West
Africa in general, and Sierra Leone, Ghana and Nigeria in
particular. However, in order to ensure that the content area
selected was one that would be perceived as meaningful and

important to the volunteers, considerable effort was expended
to sample the thinking of present and newly selected volunteers:

1.  in Toronto, a team of returned CUSO West Africa Volunteers
    and West Africans residing in the Toronto area reviewed
    and evaluated a sample of available CUSO materials in terms
    of what they thought was crucial and relevant.

2.  As the 1969 volunteers were selected during the early months
    of 1969, their thoughts were surveyed to gain some under-
    standing of what they wanted from their coming summer
    orientation programme--what did they see as vital and useful?

3.  S. L. North devoted part of a field trip to West Africa in
    February of 1969, to an interview survey with a sample of
    fifty CUSO volunteers serving in Ghana and Nigeria.  The
    survey concerned the area of knowledge or content the
    volunteers perceived as needing emphasis or special treatment
    at the coming orientation in the summer of 1969.

        In April when the survey data were studied, the results
did not confirm the earlier belief that the geography-history-
economics-cultural background content package was the most vital
and relevant one.  Rather, it was evident that what could be
termed "cultural relations" was regarded as the most necessary
content area.  Cultural relations included applied anthropology,
social psychology, linguistics, sociology, philosophy, African
thought systems, and health problems of West African society.
In concrete terms, the volunteers wanted to learn more about

West African family life, the health of the children, learning abilities of children, language patterns, occupational hopes and aspirations, patterns of child rearing, music as a vehicle for expressing West African culture, etc. These concerns seemed to reflect the volunteers' felt need to know more about and so to relate more effectively with the people of the country in which they had volunteered to serve. Unlike areas such as history and geography, rich sources of material concerning cultural relations in West Africa were not numerous nor clearly relevant to the practical interest level of the volunteers.

Very fortunately, a detailed bibliography on Human Behaviour in Africa was available at Althouse College of Education[4], and its compiler Dr. S. Irvine and associate Dr. J. Sanders, set about to prepare a special annotated set of readings for the CUSO orientation. For the demonstration model, one aspect only was selected, and this concerned health factors of two sorts: the health of the CUSO volunteer in tropical Africa, and the health problems of Africans in Sierra Leone, Ghana and Nigeria. Both of these health factors were viewed in terms of the general background of West African culture. Health was selected because of its universal interest and significance to the volunteers and because of the availability of personnel locally to develop a

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4. Human Behaviour in Africa - a mimeographed bibliography -
Educational Testing Service 1968 - Dr. S. Irvine.

relatively rich set of multi-media materials which could be related to the health information in the Irvine-Sanders annotated readings and the other written materials collected from books, journals and articles. From a very practical point of view, selection of health as the topic also answered the need of the orientation's medical consultants to try to improve their effectiveness in penetrating the volunteers' armor of indifference to health concerns. Such youthful indifference had led to more illness overseas than seemed minimally necessary.

After selecting health as the content area for the demonstration model, a small quality control group[5] was set up to screen all material used in the demonstration-model and to judge the medical relevance of the methods of presenting the health data during the demonstration.

The health topic sofar as the CUSO volunteer's own health in AFrica was concerned, included how to deal with problems of water supplies, water borne diseases, insects and their harmful effects (particularly malaria), excessive heat, the preparation of food, and, in essence, how to be one's own medical officer of health in West Africa, and, how to remain healthy, while also interracting with West Africans in their society with some sensitivity and understanding. Health as a

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[5] Dr. J. Sibley and Dr. C. Adeni-Jones, medical consultants to the CUSO West Africa Orientation in 1969.

factor in the lives of West Africans included not only inform-
ation concerning the diseases and hazards that are daily part
of life in West Africa, but also an attempt to show how the
West Africans responses to health problems are related to, and
largely arise from their society and culture.

IV  DESIGNING A LEARNER-CENTRED ENVIRONMENT

In designing the demonstration model, it will be recalled
that the researchers were attempting to create a kind of learning
cafeteria, wherein each volunteer could select the questions he
or she wanted to ask about health factors, and follow out the
particular set of learning sequences that were meaningful to
that individual.  In trying to make information available using
a full range of information media in a computer-assisted
manner, the researchers were attempting to meet the individual
learner's need in a more meaningful way than had been attempted
previously.  It was decided not to attempt to create an
encyclopedic data base for the system, but rather one that would
contain enough data to exercise the system and be useful to
the volunteers.  Apart from these considerations, it was agreed
that all the information involving any one of many different
available media had to meet the highest possible standards of
quality.  Meeting these high standards involved the researchers
and their colleagues in the preparation of a great deal of the
audio-visual material because much of the standard material

available either was not suitable to the purposes of a multi-media individualized learning environment, or, there simply was no material available.

## V    MEDIA SELECTION

The media selected were as follows:

1. Print - books, journal articles, abstracts, pamphlets, maps, printed photographs--a range of print paper media in English and French, colour and black and white.

2. Projection - front and rear screen projected visuals (slides), 16 mm. films, overhead projections with overlays.

3. Sound - tapes and portable cassette recordings.

4. Media in package combinations, sound slide programme packages, and slides and people combinations (such as a resource specialist with a random access slide projector).

5. Television - on a selective basis as background conversational programmes.

6. Computer - a time-shared interactive computer programme for conversational searching and indicative abstract selection.[6]

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[6] The project was indebted to Mr. J. Gougeon of Polycom Corp., Toronto for preparing the programmes, making the computer facilities available, and for continuous readiness to provide advice and guidance.

7.  Telephone - conference speaker-telephone equipment to permit individual or group discussions with resource people located in areas remote from the centre.[7]

Some of the health content materials utilized included:

1.  A two hour television tape, consisting of discussion sessions between a professional television interviewer[8] and one of the CUSO medical consultants--the latter also a West African and a specialist in tropical medicine.

2.  A special slide and sound package, through which the medical consultants were able to illustrate health factors using cartoons and pictures of African health situations.

3.  A second special slide and sound package through which an anthropologist discussed his slides in response to a professional interviewer[9].

4.  A third special slide and sound set of packages, one for each of the three West African countries created by CUSO staff members in dialogue with a professional interviewer, illustrating many of the general features of the culture as a background for further study and questions about health.[10]

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[7.] Bell Canada provided conference telephone equipment and terminal equipment to assist in testing the remote aspects of the system.

[8.] Mr. Percy Saltzman provided the leadership in this part of the project.

[9.] Professor C. Hopen of Scarborough College, University of Toronto made his field research materials and his time available for this phase of the project.

[10.] Mr. Benji Ishaku for Nigeria, Mr. Joe Kpakpo-Allotey for Ghana, and Mr. Leonard Pabs-Garnon for Sierra Leone; Miss Myrna Walberg provided a general sound-slide sequence for Sierra Leone.

## VI  SYSTEM DEVELOPMENT AND TESTING

·During the early months of 1969 a constant process of developing, testing, evaluating, selecting and adapting of equipment, programmes and methods was carried out.  A group of students in documentation at the School of Library Science volunteered to explore problems in coding, storing and retrieving information for a multi-media centre.

Throughout this period of experimentation every effort was made to make equipment as user-orientated as possible, and as far as the computer aspects were concerned, to have an information-finding tool that was fast in response and that used a set of terms that was related to the vocabulary of the user (the volunteer), rather than the expert.

A coding system was devised that would permit convenient location of any item in the system, whether the item was a tape, a slide pack, a slide-sound package, a book, a person (experts located at the learning centre or remote from it), a journal abstract and article, or a film.  The information retrieval system was designed in a conversational mode to possess the following programme capabilities:

1. A short response time to questions (three seconds or less).
2. Easy English words used as a code to select information.
3. Ability to provide basic information such as title, author, source, location, indicative abstract and retrieve any or all of these as required.
4. Ability to advise the user if any error was made and how to

correct the error without long delays or explanations.

5. Ability to deal with short or long finding lists without requiring the user to wait for long lists of unwanted material.

6. Ease in deleting or adding key words to retain a live, meaningful vocabulary for different users.

7. An updatable key word dictionary in alphabetic order with either code or English selection capability.

The programme was run on a General Electric 400 Series Time Sharing System. As material was gathered, an abstract or description of each item was provided, and the abstract or description was key-worded. It became very clear that experts as sources of material, needed the help of an interviewer, interrogator or discussion facilitator in order to assist the expert in focusing on material significant and interesting to the volunteer-user and at a level of dialogue intelligible to the layman.

At a weekend study session late in May, teams of volunteers, staff members and the researchers reviewed much of the printed materials for user suitability.

## VII DESCRIPTION OF THE DEMONSTRATION ENVIRONMENT

Originally, the demonstration of the learner-centred health model was to have been held in the Media Centre of the School of Library Science in Toronto. However, delays in the

preparation of some of the audio-visual materials, made it seem more useful to have the demonstration at the orientation site in London during the early stages of the orientation programme towards the end of July, 1969.

At Westminster College on the campus of the University of Western Ontario in London, two large connecting rooms, each approximately thirty by twenty feet were available for the learner-centred activity. An adjacent hallway provided access to each of the rooms. In the entrance hall was a large television monitor; just inside the first room as a large book-rack with the printed materials arranged by the number system in the computer system rather than alphabetically or by subject. Working desk space was provided where the printed material was stored. Also in the first room, but on the opposite side was the teletype terminal connected to the time-sharing computer in Toronto, and along one wall all the master electronic equipment and storage shelves for sound tapes, slide trays and films were arranged. Towards the rear half of the first room were displays of African artifacts, small head-high room dividers providing sitting or working space for the monitoring of several television channels (some provided with audio head-sets), and an area for a medical consultant to meet with volunteers. A random access slide-projector was also available in this location to provide visual stimuli or talking points. Portable tape player machines

were available, and two large tape recorders for playing audio
tapes such as medical discussions made in the field, and tapes
of selected West African music. Mid-way along one wall of the
first room was an archway leading to the second room. Just
before the archway, there was sitting space for the use of the
conference telephone system. In the second room, separated
by head high perforated dividers, were two film projectors
and screens, an overhead projector (mainly for maps of the
overlay sort), and two stations for the use of carousel-type
slide projectors equipped with sound cassettes.


VIII TESTING THE LEARNER-CENTRED CONCEPT

        Throughout the demonstration, the centre was staffed
by an operator for the computer terminal, a technician for the
television and other audio-visual equipment, a medical
consultant at the random access station, and a co-ordinator
who handled communications and expediting.

        The demonstration was designed for the use of six CUSO
volunteers who would be free to utilize the learning centre in
their own way for four hours during an afternoon. The six
volunteers were selected by one of the researchers, trying to
maintain the same sorts of background and training as the
larger sample of one hundred and fifty volunteers at the
orientation. In addition, consideration was given to their
scores indicative of emotional maturity and flexibility as

shown by certain psychological test measures used for training
purposes in the orientation programme. In particular, care was
taken to see to it that the volunteers for the demonstration
were evenly represented with respect to proneness to inductive,
experiential, person-centred interests and thinking patterns,
versus deductive, ideational, task-oriented interests and
thinking patterns. The six volunteers recruited for the
demonstration consisted of three men and three women; two of
the volunteers were professionally trained and experienced
teachers, two were minimally trained and inexperienced teachers,
while the remaining two volunteers consisted of a nurse and a
university level agricultural instructor.

## IX   OBSERVATIONS OF LEARNER-CENTRED ACTIVITY

The volunteers entered the learner-centred test area
in pairs at ten minute intervals as the demonstration commenced.
They worked without a break for the next four hours, uninter-
rupted by staff unless solicited to deal with their questions.
However, the atmosphere was anything but that of a quiet library.
The six volunteers, plus the four staff persons and the two
researchers made a total of twelve people in relatively small
quarters. From time to time, other people came into the centre,
and during the last hour, five CUSO officials and orientation
staff were present as observers. The noise level was one of
constant variation because of the intermittent clatter of the

computer terminal, the sounds of audio tapes, television
monitors, the conference telephone system, and the adjacent noise
of film projectors, carousel slide machines and other equipment.
At various points, a television camera on a mobile tripod was
moved about to record some of the activity for future study and
assessment.  In some ways, the centre had much of the superficial
appearance of a "happening", but in spite of this, the work
concentration and intensity level of the volunteers using the
centre remained at the maximum throughout the demonstration period.

In most instances, the volunteers went first of all to
the computer terminal with some sort of health question in mind.
As they gave their question to the operator, the latter typed
in the key words contained in, or suggested by the question,
and instructed the computer to search for the materials and
sources in the centre relating to those key words.  If, for
example, the volunteer asked for information about the prevention
of malaria, the computer would print out a listing of some or
all (as directed) of the information available--suggesting,
perhaps, a chapter in one of the numbered books, or an illustrated
pamphlet, a short colour and sound film, part of a sound and
slide talk on health in the tropics, a section of a video tape, or
noting that the medical consultant present was particularly
competent on this topic, or offering a list of resource
personnel available through the conference telephone system.
These resource personnel were on standby in nearby buildings,

Dr. Fred Shippham, a medical resource
person, uses a random access carousel
slide projector in answering questions
with a sma-l group of volunteers.  The
volunteers might ask any question
pertaining to health in Africa, and
where an appropriate slide would show
information visually important to the
question, Dr. Shippham would dial the
number of the slide and project it on
the rear-screen projector.

A group of test volunteers uses the
conversational teletype system.  As
the retrieval programme was designed
for self-teaching, they were able to
operate the teletype easily with
minimal training.  Here they discuss
a reference they have received by
querying the retrieval system.

Milicent Akinsulare, a trained West
African librarian, operates the
teletype system to retrieve inform-
ation for a group of volunteers. In
response to their questions, the
retrieval system would recommend a
variety of sources and media to
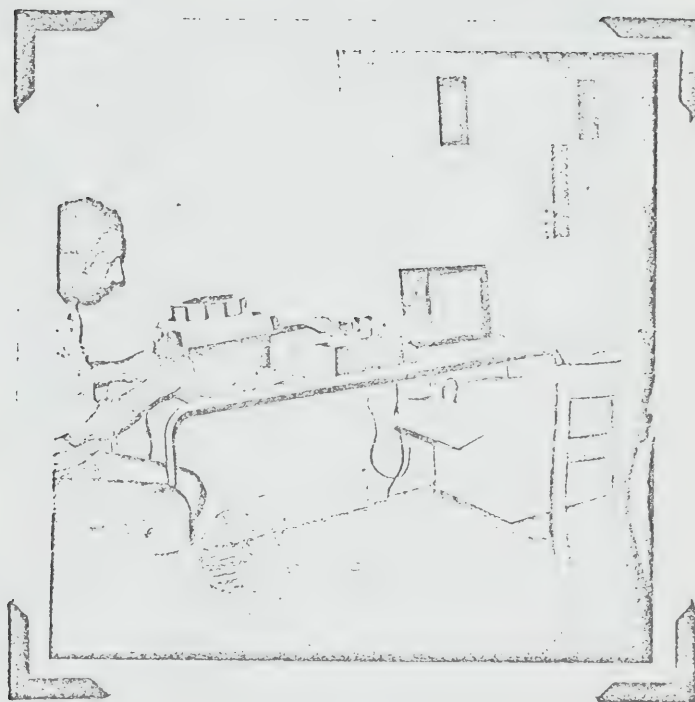assist in answering their information
needs.
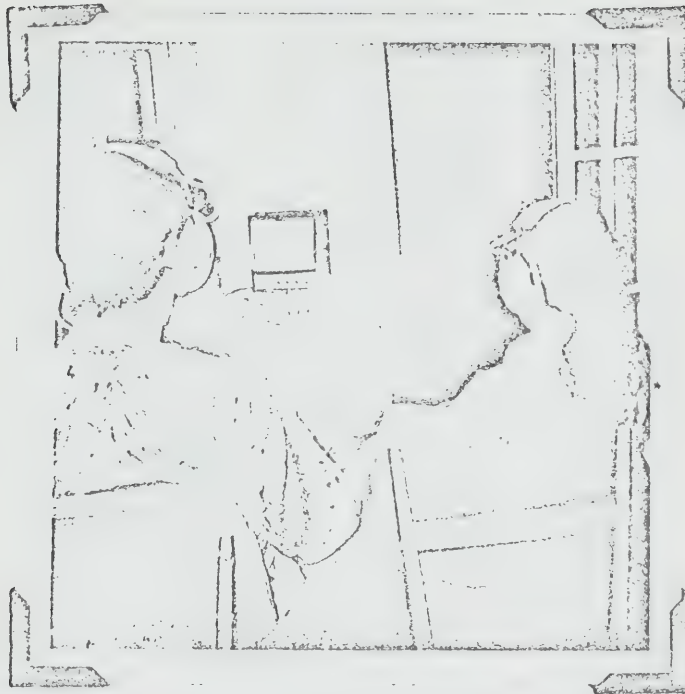
Two volunteers view a video-tape
monitor showing a programme in
which a West African medical
specialist discusses health problems
commonly faced by volunteers.

One of the authors, Dr. S. L. North,
adjusts a slide-sound programme
which individual volunteers or small
groups may use to observe differences
between health habits in North America
and in a tropical African environment.

A CUSO volunteer uses the speaker phone
to call a resource specialist located
in Hamilton, a hundred miles away,
concerning a health problem for which
there was no immediate answer available
in the existing library material. Small
groups could talk with experts available
for consultation at certain times as
reported by the retrieval system.
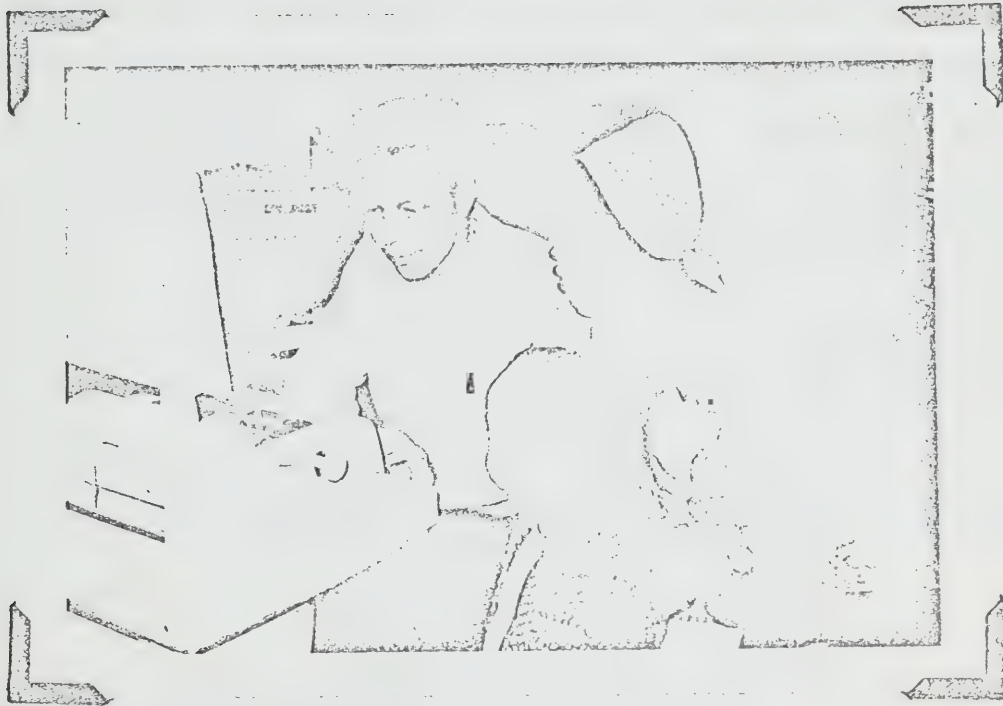
One of the authors, Prof. Donald Forgie
demonstrates how to use the key-word
system to help volunteers find approp-
riate media and information sources to
meet their individual needs.

of London and also in Hamilton and Toronto approximately one
hundred miles away.

As the volunteer received the printout of information
available, he would take his printout with him and seek out
the particular information or medium that he wished, following
the order and extent of his study entirely in accord with his
own interests. He could use some or all of the resources listed,
and, if he wished, return to the terminal for further questions.

During the test period there was a continuous sequence
of people learning in their own way, sometimes individually
and sometimes in pairs or small groups. The amount of inter-
action between the participants was in no way scheduled or
monitored. During the last hour when the CUSO observers were
present, demonstrations of various aspects of the system were
arranged for CUSO personnel and blended in with the learning of
the volunteers.


X  LEARNING PATTERNS OBSERVED

As the researchers observed the activity during the
demonstration, certain patterns were evident:

1.  The level of interest and motivation appeared to reach a
    high level quickly and to remain high throughout.

2.  While the system seemed to possess considerable flexibility
    in meeting the various needs and questions posed by the
    volunteers, the volunteers themselves showed an amazing

ability to adapt to utilize the system. In spite of the
considerable noise and activity level, they seemed neither
distracted by these factors nor more than occasionally con-
cerned with the presence of so much equipment or with being
observed by other people.

3. The rate and amount of learning appeared to be very
considerable.

4. Degree of professional training and experience did not
seem to be relevant variables in the learning process; however,
the volunteers who had earlier been identified as the inductive,
experiential, person-centred learners showed an observable
tendency to utilize first the audio-visual resources and move
next to the printed media, while the deductive, ideational, task-
oriented learners tended first to utilize the printed media and
then move to the audio-visual resources in seeking answers to
their questions. Both kinds of learners showed an equal tendency
to seek assistance from resource personnel at any time during
their learning sequences.

5. While the learner-centred model staff were required to help
handle some of the more complex equipment, the volunteers showed
a marked readiness and desire to operate much of the equipment
themselves.

6. At least as an initial experience of a few hours duration,
the researchers' expectations that a multi-media, computer-

assisted learner-centred facility would be a useful and practical way of orienting CUSO volunteers with respect to health factors in Africa seemed more than justified.

## XI  OBSERVATIONS BY THE TEST VOLUNTEERS

Following the test period, the six volunteers who had gone through the four hours of learning were interviewed as a group concerning their experience with the learning centre. The volunteers expressed great enthusiasm for this type of learning situation. Although they were aware that what they had experienced involved only a demonstration model, they were keen to have such a system expanded and further developed to include other content areas for future orientation programmes.

Some of the significance of their comments can be gathered from the following statements they made during the post-demonstration evaluation interview:

"This system is fast and it sure saves time---everywhere you go you get an answer". "For any special area of knowledge, a larger system would certainly speed up where to go for information--- usually in a library you search endlessly and sometimes never find what you want".

"A larger system would be a real learning adventure---everywhere you turn there's something interesting that inter-relates with what you set out to discover--for example, health questions lead you to geography, to economics, and back to health. You could weave your own way in and out at your own pace and level".

"In this way of learning, one could start almost anywhere in a body of knowledge and get to any other point---it wouldn't really matter where you started".

"Such a system would be excellent where you had a theme that tied ostensibly separate areas together---for instance, culture involves food, health, language and customs, and no matter where you started two people could cover the same material from different points of view. By contrast, a lecture of necessity takes in one point of view".

"If you ask a specific question, you get a listing of sources, and if you follow out the list you'll sure get a specific answer to the saturation point, but, this is interesting and there's a lot of reinforcement".

"Rather than following the listing of sources exactly, if you go slightly either side of your topic, say in the books, or watch a film, or talk to the expert, you get everything else reinforced in the context of what you are learning".

"If you don't have time for a broad learningsession, you can take out of it just what you need".

"With a lot of people trying to use a system like the one we used today, you could get some real lineup problems---wouldn't you have to have some sort of schedule"?

"Maybe not everyone would like to learn by asking questions--some people like to poke and browse, but I guess they could do that if they wanted?"

## XII  OPERATIONAL TESTING

Following the demonstration session, the director of the CUSO West Africa programme and the orientation directors requested that the learner-centred facility be made available to all the volunteers at the 1969 orientation.  Such a request meant moving from a research demonstration mode to an operational or "production" phase.  The possibility of serious queuing problems developing and the lack of staff trained to operate the on-line retrieval system at all times for a wide range of media and equipment in simultaneous operation, were problems that were anticipated.  However, it was agreed an attempt would be made to extend the use of the research model for use by the rest of the volunteers.

Subsequently, over a period of seven days, the learning centre was open for three hours of full operation each evening, and, during every afternoon without the computer system available --during this latter period the volunteers from the previous evening were able to work out learning programmes they had retrieved from the computer.  The volunteers went through the centre in groups of fifteen to twenty, although with the numerous visitors who came to observe or participate, it was not unusual for twenty-five to thirty people to be in the centre at any one time.  While a schedule was made available so that volunteers could sign up for specific time periods to use the

centre, the centre was operated on an open door policy, and no
one wishing to use the centre was asked to come back another
time. The centre was staffed by one co-ordinator, one on-line
computer retrieval operator and one technician. In addition,
several people were available from time to time to assist
with equipment; these volunteers were trained during the
operation of the centre to handle the shared-time computer
retrieval system so that the regular operator could be spelled
off from time to time.

The anticipated queuing and staffing difficulties
posed no serious problems. It may be that because the
learner-centred system was developed with a view to maximum
flexibility and with an emphasis upon the needs of the learner,
it was possible to handle queuing and staff training problems
that might have overwhelmed a more rigid, equipment-centred
system.

The experience gained in the design and use of a multi-
media, computer-assisted learner-centred environment with one
aspect of the CUSO West Africa orientation on a demonstration
basis, and for a short period of operational experience with
larger numbers, provided a clear indication that such a system
can be used effectively for individualized learning by medium
sized groups. Such a development necessarily involves adequate

careful material selection and an operational staff capable of working effectively in a non-structured learning environment. The experience has encouraged CUSO to proceed with the expansion of the demonstration model to a more extensive one that inter-relates many aspects ofcultural factors. Research and develop-ment are now planned for alarger learner-centred facility for the 1970 orientation for the CUSO West Africa programme.

XIII  SUMMARY AND IMPLICATIONS

A model of a learner-centred environment was designed, developed, tested and used in an operational fashion for the CUSO 1969 West Africa Orientation Programme at London, Ontario. The model involved the integration of a variety of information media and resource persons with an on-line computer terminal as an interactive finding tool to enable the volunteers to learn about health problems in Africa. The project explored the usefulness to the learner of an unstructured, "cafeteria-style" learning environment in which pertinent information was readily available inmany media without inconvenience or delay. The model was designed to by-pass the usual, difficult problems of more traditional classroom and library approaches to learning. The volunteers preferred the individualized learning environment to that of the overly timetabled, highly administered, lecturer-centred learning system. The project demonstrated that small, highly pertinent collections of material, combined with resource

experts and a variety of media can provide an effective, highly motivating learner-centred environment using presently available information retrieval technology.

Operational use of the learner-centred model indicates that it is possible to handle groups of thirty to forty people without problems of queuing or confusion. Information data bases need not be of a vast size provided they are of high quality, relevant to the learner's needs and integrated with resource experts who have both breadth and depth in experience. As Ackoff has noted, what is usually needed is not more information, but less mis-information in an information system.

The experience with the model suggests that a well designed learning environment does not require scheduling and administrative controls in order to be effective. What is more important is convenience in obtaining what the learner wants, and a variety of selection wide enough to meet differing learning patterns. In addition, an automated learning system that did not involve available resource persons would not likely provide the information response capabilities of a combined human and media system. While the CUSO summer experience showed that equipment control and specialized materials need to be in the hands of a qualified technician, the effectiveness of the learning centre technician depended heavily upon placing control of the viewing or listening phases of the learning in the hands of the learner.

It may be that a learner-centred model of the sort reported in this paper could be effectively extended for use in other learning institutions such as universities, professional training institutions and high schools. If the learner-centred system used during the summer of 1969 is extended and enlarged for subsequent CUSO orientation sessions, it may be possible to learn how such systems can be utilized and internalized in more permanent learning situations.

'seminars' were held in the centre; at other times, larger
groups met nearby in response to needs expressed by many
volunteers.

The stimulating and exciting result of this brief
experiment led us to undertake a more ambitious project for
the CUSO Orientation in the summer of 1969. We could see that
there was a real possibility that with some guidance, the learner
*really was* a rather responsible judge of what he wanted to
learn, what he needed to learn, and when and how he ought to
learn it!

In order to test out the project we selected from
among the great variety of topics that staff had previously
laboured to "get across" to the volunteer. We selected the
area of the volunteer's health during his two year assignments
in West Africa. We chose this area because it was one that the
young, healthy volunteers in CUSO tended to disregard, and which
no amount of expertly delivered lectures or skillfully led
discussions by medical experts seemed to make any sort of
significant dent in the awareness of the volunteer. In preparation
for the CUSO Orientation Programme for 1969, S.L. North and
D.G. Forgie develped a pilot model of a learner-centred environ-
ment covering the volunteers' health orientation.[1] Essentially
the model could be described as a learner-centred, resource
persons and multi-media, computer-assisted programme. A wide
variety of materials -- books, articles, films, video tapes,
sound-tapes, slide-sound talks, artifacts, photographs, and a
small group of tropical health experts was assembled. So that
the volunteer could find out very quickly what array of resources
was available concerning his specific questions, the entire set
of materials was summarized or abstracted, and keywords identified
for each summary or abstract.

The summaries and keywords were stored in a GE 400 series
shared-time computer system -- the computer was in Toronto while
a teletype keyboard was in the centre in London, linked to the
computer via a telephone line. Typing in keywords, such as
'malaria', 'prevention','Northern Nigeria' would quickly produce
a printout from the terminal consisting of the mix of resource
people and media resource items available to the volunteer. All
the print, audio-visual resources and the medical resource persons
were in the centre and during a two week period over three
hundred people spent time in the centre (average of a half day
each) with up to forty volunteers in the centre at one time.
Instead of the chaos one might sensibly expect, there was an
informal, busy, highly interested level of activity with no
serious queuing or pile-up problems. The enthusiastic response

1. This project is more fully described in: "Multi-media programme
shows CUSO volunteers a new way to learn", North, S.L. and
Forgie, D.L., Canadian University and College Journal, April, 1970.

of the volunteers and the resource staff led us to conclude
that the model justified expansion to cover the full range of
the orientation topics for the 1970 programme. Subsequently,
the system was expanded and was heavily utilized by the
volunteers in the five weeks of the 1970 CUSO West Africa
Orientation. This system included some fifteen hundred resource
items and a resource persons pool of sixteen people. The content
included items concerned with education in West Africa, art,
music and literature, anthropological and cultural data, health,
Canadian social and political problems, etc..

In the intervening year this system has been used as
an ancillary teacher-training resource at Althouse College of
Education, and as the site of a variety of short training sessions
for groups in education and medicine.

This summer, the system is being expanded further to
include data for East Africa for CUSO, data concerning contemporary
social issues in Canada (of special interest in training social
science teachers) and data concerning native peoples of North
America (of special interest in training teachers and for helping
native peoples to preserve and share their own cultures).

Many refinements in computer technique, in audio-
visual resource development, and in discoveries of new uses for
the learner-centre have taken place. However, we are more
concerned with the central question -- how to assure that we
provide an individualizing, personalizing, humanizing learning
environment. The learner-centre seems to make for a more
frequent, close and informal relationship between the volunteer
and the resource person in a situation where they function more
as co-learners than as role-defined beginner and expert. This
year we have undertaken a more thorough evaluation programme
aimed at determining more clearly how and what the volunteer
learns in our centre.

Beyond the present use of the learner-centre as a
CUSO-Althouse resource, we believe we can see some of the
uniquenesses of this system and ways its concepts could be
applied beyond its present setting. Some of its uniquenesses
seem to be:

1. It permits a greater degree of individualized learning
such that the learner may follow out his own interests, set his
own rate, and determine his own path to the goals he has set.

2. In the use of the centre the person may take a variety
of approaches at different times for different problems,
emphasizing analysis or synthesis, induction or deduction, single
or multiple variables, professional assignment oriented or
cultural context oriented emphases. He is less bound to a
linear, sequential process of learning tied to a common curriculum
at any one point in time or limited by the unwitting nudging

into one method or another by his teacher's style or approach.

3. The centre appears to facilitate the understanding of the relationships between topics, often across different 'disciplines', and particularly where the content involves adapting to changes in the learner's values, attitudes, prejudices and sentiments. These latter areas are often the nuclear ones involved in cross-cultural education in particular, although we suspect they are (or ought to be) involved in relevant learning of any sort -- for example, the study of science for its own sake divorced from an awareness of its social role and impact in a technological society seems to contribute to the commonly observed closed-minded and alienated tendency we see in ourselves and our fellows.

4. The centre seems to make for a closer and more stimulating relationship between learner and teacher. If one is careful to subordinate the technology of such a centre to the human needs and capacities of the *people* in it, the result seems to be to enhance and extend these capacities rather than to limit them.

Some of the other applications of the principles and concepts of the learner-centre appear to be:

1. Use as a learner-centre to extend and enrich courses in the later elementary, secondary and university levels. Courses such as history, geography, and English literature immediately come to mind; we would suggest that courses in chemistry, physics, biology, computer science and even 'pure' mathematics could similarly be better taught in close conjunction with a centre of this sort.

2. Use of the learner-centre in situations where multiple disciplines combine to deal with topics that straddle knowledge without regard for the fences we often erect. Cross-cultural learning, and contemporary social issues are immediate examples. Educators have for years stressed that work in history, geography, politics, literature and the arts ought to be studied so that the student begins to map in a picture of the whole from which each of these subjects is an unreal cross-section of life. We believe a centre such as we have created could help with cross-disciplinary work, not only by providing an outlet for the creative motivation of students but also by providing an enriching and improved setting for teachers. Certainly too, the training of professionals such as physicians, teachers, social workers, and psychologists might be greatly improved in a problem-solving setting such as the learner-centre.

3. Apart from its use in existing educational and training settings, the potential exists to extend the varied and extensive resources of such a centre into less populated areas of a

# Multi-media program shows CUSO volunteers a new way to learn

*In the summer of 1969 a pilot project was launched to provide expanded use of audiovisual media for the West African orientation program of Canadian University Service Overseas. The test model was designed by the authors and developed in the media centre of the school of library science at the University of Toronto, in liaison with colleagues from CUSO and Althouse College of Education, University of Western Ontario. The project was in response to a declared need for a more individualized learning approach in the CUSO orientation program. The sizable amount of material to be learned, combined with severe limitations of time, had tended to prevent much individualized, learner-centred emphasis. The aim of the program was to harness modern technology to overcome these limitations and to provide student volunteers with the necessary health and culturally related understandings, before their total immersion for two years of work in Africa.*
*Can these needs be met by available technology without very large expenditures on research and development? The experimental test program was carried out in London, Ont., in July at the orientation site, and proved so useful and exciting that the program administrators and student volunteers asked that it be immediately made available for 150 volunteers in training.*

Dr. North is a psychologist with the Nathaniel Hutchson Institute, Burlington, Ontario, and education consultant to the CUSO West African orientation program. Professor Forgie is in charge of the media centre, School of Library Science, University of Toronto.
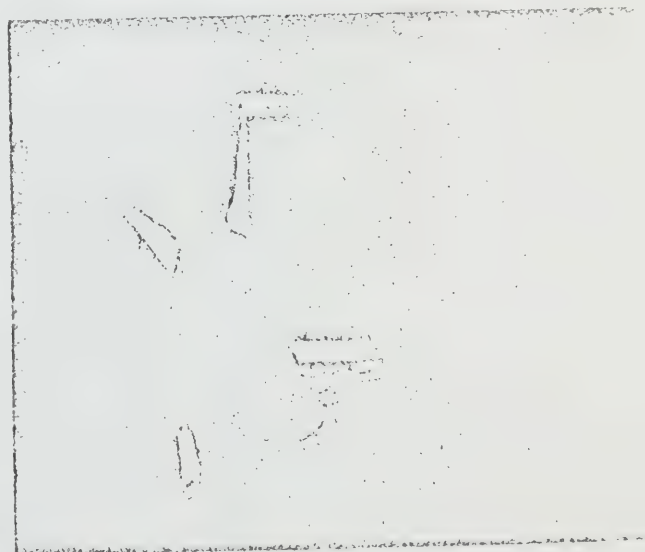
## By S. L. NORTH and D. L. FORGIE

THE CONCEPT OF USING presently available technology to bypass some of the usual and difficult problems of more traditional classroom and library approaches to learning, appeared so potentially rewarding that the University of Toronto's school of library science decided to make available the full resources of its media centre over a six-month period, commencing January 1969, for the design, development and feasibility testing of a learner-centred multi-media environment. Throughout the development of the project the authors were concerned with how much the test group would learn in relating to the technology. The results obtained from a series of interview test questions to the representative group of student volunteers at the conclusion of the test program, were encouraging and informative.

In our opinion, the initial results demonstrated clearly that programs of this sort can be effectively developed to permit educators to achieve the traditional objectives of suiting the content and methods of instruction to the needs, interest, abilities and motivations of students, through effective use of technology. Learner-centred systems, combining human and technological resources, may well constitute exciting potentials for achieving this goal.

With the variety of equipment presently available to educators, it is possible and vitally important that the design and use of equipment, and technological methods be required to fill the needs of the learner, and not require the learner to fit himself, in the manner of the bed of Procrustes, to the characteristics of technology. In a learner-centred environment, the learner has a real opportunity of choosing what he learns, when he learns, and largely how he learns it without being dominated by the system. The general concept outlined in this article, provides the basis for developing excellent learning environments for relatively large groups of properly motivated people. The steps involved in development of the learner-centred program, and identification of criteria related to its use and application as a modern educational tool began with the authors attempting to visualize the kind of centre or environment a learner might wish to have.



*Dr. North demonstrates a remote-access carousel slide projector, one of several visual media used to give individual users and small groups information on specific areas of study in the CUSO orientation program.*

## Computer has role of small-town librarian

Initially, the facility required was envisioned as consisting of a multi-media, computer-assisted information retrieval and problem-solving centre. It seemed possible to store information concerning a significant area of knowledge in the computer memory, gain rapid access to this information through a teletype terminal linked to a time-sharing computer by telephone line, and use the resulting print-out as a guide to a variety of multi-media sources relevant to the volunteer's interest.

If, for example, the volunteer asked a question about the geography of Nigeria, the terminal operator would enter the key words relevant to the question and, through the terminal, the computer would print out a list of information available in the centre bearing on the question — and the media available to be used in obtaining the answer. A question about the desert region of northern Nigeria could therefore be expected to produce a computer listing that gave the volunteer the choice of the form in which the answer would be received.

This might include viewing a map on an overhead projector, seeing part of a color sound movie, operating a slide-sound system, reading a selected chapter of a book, listening to an audio tape, discussing his question with an expert located at the centre or contacting another expert outside the centre by means of a speaker telephone, or viewing several videotapes. Essentially a learning environment of this type was envisioned as attempting to provide a service to the learner, similar to that of the librarian in a small town library who knew what was in every book and had the knack of being able to interrelate all the separate items of information in response to any question posed to her.

## Learning process dictates techniques

The focus of the project was not to be on the instructional aids, equipment or technology, however, but on the learning process of the individual volunteer. In pursuing this interest from a learner-centred, rather than a staff-centered, approach it was recognized that some new techniques might

need to be developed in the utilization of multi-media and other library resources. An approach of this sort related to the continuing research programs at the library school.

To ensure that the content areas selected would be perceived as meaningful to the *new* volunteers, present, newly selected and returned volunteers were surveyed. In addition, Dr. North devoted part of a field trip to West Africa in February 1969 to an interview survey of a sample of fifty CUSO volunteers then serving in Ghana and Nigeria.

A basic concept in the system design was to go directly to the users to find out what they needed and wanted. The results of these surveys did not confirm earlier beliefs that a content package of geography-history-economics and culture provided the most vital or relevant background. Instead, what could be termed "cultural relations" was regarded as most necessary. In concrete terms, the volunteers wanted and needed to learn more about West African family life, the health and learning abilities of the children, language problems, job aspirations, patterns of child rearing, and music as a vehicle for expressing West
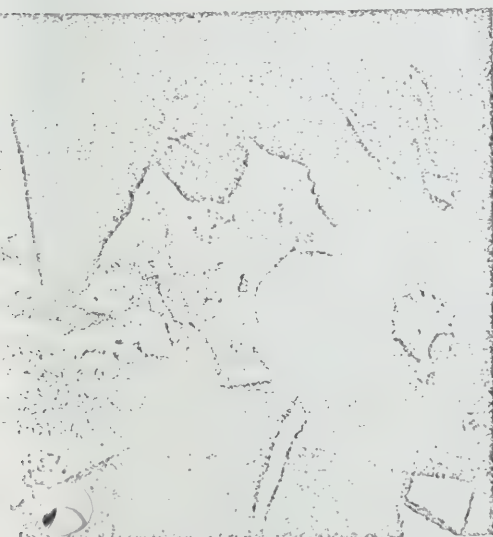


*Time-sharing keyword system provided sources of information and media to individual requests. Prof. Forgie explains the retrieval system to Milicent Akinsulare . . .*

*. . . a West African Graduate of University of Toronto's school of library science, who was thus able to provide assistance to groups of CUSO volunteers as they requested the information they wanted to study.*

African culture. In brief, they wanted to know more about, and so relate more effectively with, the people of the country in which they had volunteered to serve.

For the initial experimental system, health was chosen as the in-depth subject area and concerned first, the health of the CUSO volunteer in tropical Africa; and second, health problems of Africans in Sierra Leone, Ghana and Nigeria. Both subject areas were developed in terms of the general background of West African culture, and a few items related to the broad "cultural relations" needs were also included where available.

The topic of health had to be related to an environment quite different from that of North America, and both unknown and potentially frightening to a novice. Subjects included such problems as water supplies, water-borne diseases, insects and their harmful effects (particularly malaria), excessive heat, and food preparation. In essence: how to be your own medical officer of health, and how to remain healthy while interacting with West Africans in *their* society, with some sensitivity and understanding. Health as a factor in the lives of West Africans related health problems to their society and culture — just as our health hazards can be related to our culture, industrial development and customs.

## Aim to create a 'learning cafeteria'

In designing the demonstration model, a basic objective was to create a kind of "learning cafeteria," in which each volunteer could select the questions he or she wanted to ask about health factors, and follow out the particular set of learning sequences that were meaningful to that individual. In trying to make information available using a full range of information media in a computer-assisted manner, the researchers were attempting to meet the individual learner's need in a more meaningful way than had been attempted previously.

It was decided not to attempt to create an encyclopaedic data base for the system, but rather one that would contain enough data to exercise the system and be operationally useful to the volunteers. Apart from these considerations, it was agreed that all the

information involving any one of many different available media had to meet the highest possible standards of quality. Meeting these high standards involved the researchers and their colleagues in the preparation of a great deal of the audiovisual material because much of the standard material available either was not suitable to the purposes of a multi-media individualized learning environment, or there simply was no material available. The media selected were:

*Print* — books, journal articles, abstracts, pamphlets, maps, printed photographs, a range of print paper media in English and in French, color and black and white.

*Projection* — front and rear-screen projected visuals (slides), 16mm films, overhead projections with overlays.

*Sound* — tapes and portable cassette recordings.

*Media combination packages* — e.g. sound-slide program packages, or slides and people combinations (such as a resource specialist with a random access slide projector).

*Television* — on a selective basis as background programs or for individual viewing.

*Computer* — a time-shared interactive computer program for conversational searching and indicative abstract selection.

*Telephone* — a conference speakerphone to permit individual or group discussions with resource people located in areas remote from the centre.

Some of the health content materials we used included a two-hour television tape, consisting of discussion sessions between a professional TV interviewer and one of the CUSO medical consultants (the latter also a West African and a specialist in tropical medicine). Special slide and sound packages, with which the medical consultants were able to illustrate health factors using cartoons and pictures of African health situations (through which an anthropologist discussed his slides in response to a professional interviewer) were also available.

During the early months of 1969 a constant process of developing, testing, evaluating, selecting and adapting of equipment, programs and methods was carried out. A group of students in Documentation 578X at the school



*A CUSO volunteer in London uses the speaker phone to call a resource specialist in Hamilton, 100 miles away, about a health problem for which the existing library material afforded no immediate answer. Small groups were able to talk with experts available for consultation at certain times as reported by the retrieval system.*

of library science volunteered to explore problems in coding, storing and retrieving information for a multimedia centre.

Throughout this period of experimentation every effort was made to make equipment as user-oriented as possible and, as far as the computer aspects were concerned, to have an information-finding tool that was fast in response and used a set of terms that was related to the vocabulary of the *user* (the volunteer), rather than the expert.

In addition to the development of materials, it was therefore necessary to develop an information retrieval system designed for conversational use and to develop a coding system to permit location of any item from books to people, or from sound tapes to slide-sound packages. The following criteria were considered essential:

—familiar English words for information selection.

—provision of basic information: title, author, source, abstract and selective retrieval of any or all of these as requested by the user.

—ability to advise users of request errors and how to correct these easily.

—ability to provide both short and longer lists of items without the user waiting for long lists of unwanted material.

—ease in adding or upgrading items and key words.

—a self-updating key word dictionary, alphabetically ordered and self-coding.

## Shaping a learner centred environment

When initial testing and development were completed, the total system was moved from the media centre of the school of library science at U of T to Westminster College on the campus of the University of Western Ontario. Two large connecting rooms there, each approximately 30 x 20 ft, were available for the learner-centred activity. An adjacent hallway provided access to each of the rooms. In the entrance hall was a large television monitor; just inside the first room was a large bookrack with printed materials arranged numerically rather than alphabetically or by subject. Working desk space was provided where the printed material was stored. Also in the first room, but on the opposite side was the teletype terminal connected to the time-sharing computer in Toronto. Along one wall the master electronic equipment was located and storage shelves were provided for sound tapes, slide trays and films also numerically arranged.

Toward the rear half of the first room were displays of African artifacts, small head-high room dividers providing sitting or working space for the monitoring of several television channels (some provided with audio head-sets), and an area for a medical consultant to meet with volunteers. A random access slide-projector was also available in this location to provide visual stimuli or talking points. Portable cassette playback machines were available for individual use, and two reel-to-reel tape recorders for playing audio tapes such as medical discussions made in the field, or tapes of selected West African music. Midway along one wall of the first room was an archway leading to the second room. Just before the archway, there was sitting space for the use of the conference telephone system. In the second room, separated by head-high perforated dividers, were two film projectors and screens, an overhead projector (mainly for maps of the overlay sort), and two stations for the use of carousel-type slide projectors equipped with sound cassettes.

Throughout the demonstration, the centre was staffed by an operator for the computer terminal, a technician for the television and other audiovisual equipment, a medical consultant at the random access station, and a co-ordinator who handled communications and expediting.

The demonstration was designed for the use of six CUSO volunteers who would be free to utilize the learning centre in their own way for four hours during an afternoon. The six volunteers were selected by one of the researchers, trying to maintain the same sorts of background and training as the larger sample of 150 volunteers at the orientation. In addition, consideration was given to their scores indicative of emotional maturity and flexibility as shown by certain psychological test measures used for training purposes in the orientation program.

## How the system works for the learners

In particular, care was taken to see to it that the volunteers for the demonstration were evenly represented with respect to proneness to inductive, experiential, person-centred interests and thinking patterns, versus deductive, ideational, task-oriented interests and thinking patterns. The six volunteers recruited for the demonstration consisted of three men and three women; two of the volunteers were professionally trained and experienced teachers, two were minimally trained and inexperienced teachers, while the remaining two volunteers consisted of a nurse and a university-level agricultural instructor.

The volunteers entered the learner-centred test area in pairs at ten-minute intervals as the demonstration began. They worked without a break for the next four hours, uninterrupted by staff unless solicited to deal with their questions. However, the atmosphere was anything but that of a quiet library. The six volunteers, plus the four staff persons and the two researchers made a total of twelve people in relatively small quarters. The noise level was one of constant variation because of the intermittent clatter of the computer terminal, the sounds of audio tapes, television monitors, the conference telephone system and the adjacent noise of film projectors, carousel slide machines and other equipment. In some ways, the centre had much of the superficial appearance of a "happening," but in spite of

this, the work concentration and intensity level of the volunteers using the centre remained at the maximum throughout the demonstration period.

In most instances, the volunteers went first of all to the computer terminal with some sort of health question in mind. As they gave their question to the operator, the latter typed in the key words contained in, or suggested by the question, and instructed the computer to search for the materials and sources in the centre relating to those key words. If, for example, the volunteer asked for information about the prevention of malaria, the computer would print out a listing of some or all (as directed) of the information available — suggesting, perhaps, a chapter in one of the numbered books, or an illustrated pamphlet, a short colour and sound film, part of a sound and slide talk on health in the tropics, a section of a videotape, or noting that the medical consultant present was particularly competent on this topic, or offering a list of resource personnel available through the conference telephone system. These resource personnel were on standby in nearby buildings in London and also in Hamilton and Toronto, approximately 100 miles away.

As the volunteer received the print-out of information available, he would take it with him and seek out the particular information or medium that he wished, following the order and extent of his study entirely in accord with his own interests. He could use some or all of the resources listed, and, if he wished, return to the terminal for further questions.

## System and students respond to each other

During the test period there was a continuous sequence of people learning in their own ways, sometimes individually and sometimes in pairs or small groups. The amount of interaction between the participants was in no way scheduled or monitored. During the last hour when the CUSO observers were present, demonstrations of various aspects of the system were arranged for CUSO personnel and blended with the learning process.

As the researchers observed the activity during the demonstration, certain patterns were evident:

1. The level of interest and motivation appeared to reach a high level quickly and to remain high throughout.

2. While the system seemed to possess considerable flexibility in meeting the various needs and questions posed by the volunteers, the volunteers themselves showed an amazing ability to adapt to utilize the system. In spite of the considerable noise and activity level, they seemed neither distracted by these factors nor more than occasionally concerned with the presence of so much equipment or with being observed by other people.

3. The rate and amount of learning appeared to be considerable.

4. Degree of professional training and experience did not seem to be relevant variables in the learning process. However, the volunteers who had earlier been identified as the inductive, experiential, person-centred learners showed an observable tendency to use first the audiovisual resources and move next to the printed media; while the deductive, ideational, task-oriented learners tended first to use the printed media and then move to the audiovisual resources in seeking answers to their questions. Both kinds of learners showed an equal tendency to seek assistance from resource personnel at any time during their learning sequences.

5. While the learner-centred model staff were required to help handle some of the more complex equipment, the volunteers showed a marked readiness and desire to operate much of the equipment themselves.

6. At least as an initial experience of a few hours' duration, the researchers' expectations that a multi-media, computer-assisted, learner-centred facility would be a useful and practical way of orienting CUSO volunteers, with respect to health factors in Africa, seemed more than justified.

## 'Everywhere you go you get an answer'

Following the test period, the six volunteers who had gone through the four hours of learning were interviewed as a group concerning their experience with the learning centre. The volunteers expressed great enthusiasm for this type of learning situation. Although they were aware that

what they had experienced involved only a demonstration model, they were keen to have such a system expanded and further developed to include other content areas for future orientation programs.

Some of the significance of their comments can be gathered from the following statements they made during the post-demonstration evaluation interview:

"This system is fast and it sure saves time — everywhere you go you get an answer."

"For any special area of knowledge, a larger system would certainly speed up where to go for information; usually in a library you search endlessly and sometimes never find what you want."

"A larger system would be a real learning adventure. Everywhere you turn there's something interesting that interrelates with what you set out to discover; for example, health questions lead you to geography, to economics, and back to health. You could weave your own way in and out at your own pace and level."

"In this way of learning, one could start almost anywhere in a body of knowledge and get to any other point — it wouldn't really matter where you started."

"Such a system would be excellent where you had a theme that tied ostensibly separate areas together; for instance, culture involves food, health, language and customs, and no matter where you started two people could cover the same material from different points of view. By contrast, a lecture of necessity takes in one point of view."

"If you ask a specific question, you get a listing of sources, and if you follow out the list you'll get a specific answer to the saturation point, but this is interesting and there's a lot of reinforcement."

"Rather than following the list of sources exactly, if you go slightly either side of your topic, say in the books, or watch a film, or talk to the expert, you get everything else reinforced in the context of what you are learning."

"If you don't have time for a broad learning session, you can take out of it just what you need."

"With a lot of people trying to use a system like the one we used today, you could get some real line-up prob-

lems. Wouldn't you have to have some sort of schedule?"

"Maybe not everyone would like to learn by asking questions — some people like to poke and browse, but I guess they could do that if they wanted?"

## Move from research to 'full production'

Following the demonstration session, the director of the CUSO West Africa program and the orientation directors requested that the learner-centred facility be made available to all the volunteers at the 1969 orientation. Such a request meant moving from a research demonstration mode to an operational or "production" phase. The possibility of serious queuing problems developing and the lack of staff trained to operate the on-line retrieval system at all times for a wide range of media and equipment in simultaneous operation, were difficulties that were anticipated. However, it was agreed an attempt would be made to extend the use of the research model for use by the rest of the volunteers.

Subsequently, over a period of seven days, the learning centre was open

*Printed media — books, monographs, excerpts, maps and pictures — also formed part of the resource collection. A reading table was set up adjacent to information sources.*

## Multi-media: new way to learn

continued from page 36

for three hours of full operation each evening, and, during every afternoon without the computer system available. During this latter period the volunteers from the previous evening were able to work out learning programs they had retrieved from the computer. The volunteers went through the centre in groups of 15 to 20, although with the numerous visitors who came to observe or participate, it was not unusual for 25 to 30

people to be in the centre at any one time.

The anticipated queuing and staffing difficulties posed no serious problems. It may be that because the learner-centred system was developed with a view to maximum flexibility and with an emphasis upon the needs of the learner, it was possible to handle queuing and staff training problems that might have overwhelmed a more rigid, equipment-centred system.

What is the significance of a learer-centred approach properly app with respect to present teachin learning systems? The answer, course, will vary with each individ group and application, and one of great strengths and opportunities the approach is that it provides t type of flexibility providing learne teachers and administrators the c portunity to achieve, at least in pa what educational theorists have lc exhorted practitioners to do: ada the materials, media and teachi methods to the needs of the us While providing many advantages, t approach requires that additional cc sideration and emphasis be placed the selection of content and that th making the selection be fully aware the important effect that the choice media has on the content. A progra for example, that is an excellent cc ored film may or may not be effecti in black and white on a TV scree

### Bring together ideas, technologies, people

First, effective use of the approa therefore requires the development new knowledge and new skills t those concerned with making a learer-centred environment available. S_ ondly, it requires effective applicati of the concept of sharing both with and between participating groups, f example, in the case of the pil learner-centred program develope for CUSO and outlined here, . though the design and developme criteria and the operattional envirc ment developed were the responsib ty of the authors, the project engag: the support and co-operation of mar diverse groups.

Colleagues in other departments the University of Toronto, at A house College of Education, t School of Library and Informatic Science of the University of Wester Ontario, McMaster University Heal Science Centre and Michigan St University provided back-up mater als, equipment and assistance as nee ed and sometimes on short notic Outside the university communit Bell Canada obtained and installed r quired equipment and provided sur port essential to the testing and deve opment of the program. Polycom Sy tems Limited provided staff assistan in software development, to indica some of the shared assistance exper enced. The project therefore was a example of the type of inter-univers ty, inter-city and inter-company c operation basic to information retric al development.

ENVIRONMENT

*Appendix F*

## S. L. North and D. J. Forgie

*Excerpted from the paper "Development of a Pilot Model of a
Learner-Centered Environment," a project carried out for the CUSO
West Africa Orientation Program, conducted at Althouse College,
Summer 1969.*

The researchers were attempting to create a kind of learning cafeteria,
wherein each volunteer could select the questions he or she wanted to
ask about health factors, and follow out the particular set of learning
sequences that were meaningful to that individual. In trying to make
information available using a full range of information media in a
computer-assisted manner, the researchers were attempting to meet the
individual learner's need in a more meaningful way than had been
attempted previously. It was decided not to attempt to create an
encyclopedic data base for the system, but rather one that would
contain enough data to exercise the system and be useful to the
volunteers. Apart from these considerations, it was agreed that all the
information involving any one of many different available media had to
meet the highest possible standards of quality. Meeting these high
standards involved the researchers and their colleagues in the prepara-
tion of a great deal of the audiovisual material because much of the
standard material available was either not suitable to the purposes of a
multi-media individualized learning environment, or, there simply was
no material available.

■

### MEDIA SELECTION

The media selected were as follows:

*Print:* books, journal articles, abstracts, pamphlets, maps, printed
photographs – a range of print paper media in English and French,
color and black and white.

*Projection:* front and rear screen projected visuals (slides), 16 mm.
films, overhead projections with overlays.

*Sound:* tapes and portable cassette recordings.

*Media in package combinations:* sound slide program packages, and
slides and people combinations (such as a resource specialist with a
random access slide projector).

*Television:* on a selective basis as background conversational
programs.

*Computer:* a time-shared interactive computer program for conversational searching and indicative abstract selection.

*Telephone:* conference speaker-telephone equipment to permit individual or group discussions with resource people located in areas remote from the center.

Some of the health content materials utilized included:

1. A two-hour television tape, consisting of discussion sessions between a professional television interviewer and one of the CUSO medical consultants — the latter also a West African and a specialist in tropical medicine.

2. A special slide and sound package, through which the medical consultants were able to illustrate health factors using cartoons and pictures of African health situations.

3. A second special slide and sound package through which an anthropologist discussed his slides in response to a professional interviewer.

4. A third special slide and sound set of packages, one for each of the three West African countries, created by CUSO staff members in dialogue with a professional interviewer, illustrating many of the general features of the culture as a background for further study and questions about health.

<p style="text-align:center">*   *   *</p>

### DESCRIPTION OF THE DEMONSTRATION ENVIRONMENT

Originally, the demonstration of the learner-centered health model was to have been held in the Media Centre of the School of Library Science in Toronto. However, delays in the preparation of some of the audiovisual materials, made it seem more useful to have the demonstration at the orientation site in London during the early stages of the orientation program toward the end of July 1969.

At Westminster College on the campus of the University of Western Ontario in London, two large connecting rooms, each approximately thirty by twenty feet were available for the learner-centered activity. An adjacent hallway provided access to each of the rooms. In the entrance hall was a large television monitor; just inside the first room was a large bookrack with the printed materials arranged by the number system in the computer system rather than alphabetically or by subject. Working desk space was provided where the printed material was stored. Also in the first room, but on the opposite side, was the teletype terminal connected to the time-sharing computer in Toronto, and along one wall all the master electronic equipment and storage shelves for sound tapes, slide trays and films were arranged. Toward the

Rear half of the first room were displays of African artifacts, small head-high room dividers providing sitting or working space for the monitoring of several television channels (some provided with audio head-sets), and an area for a medical consultant to meet with volunteers. A random access slide-projector was also available in this location to provide visual stimuli or talking points. Portable tape player machines were available, and two large tape recorders for playing audio tapes such as medical discussions made in the field, and tapes of selected West African music. Mid-way along one wall of the first room was an archway leading to the second room. Just before the archway, there was sitting space for the use of the conference telephone system. In the second room, separated by head-high perforated dividers, were two film projectors and screens, an overhead projector (mainly for maps of the overlay sort), and two stations for the use of carousel-type slide projectors equipped with sound cassettes.

*    *    *

OBSERVATIONS OF LEARNER-CENTERED ACTIVITY

The volunteers entered the learner-centered test area in pairs at ten minute intervals as the demonstration commenced. They worked without a break for the next four hours, uninterrupted by staff unless solicited to deal with their questions. However, the atmosphere was anything but that of a quiet library. The six volunteers, plus the four staff persons and the two researchers made a total of twelve people in relatively small quarters. From time to time, other people came in the center, and during the last hour, five CUSO officials and orientation staff were present as observers. The noise level was one of constant variation because of the intermittent clatter of the computer terminal, the sounds of audio tapes, television monitors, the conference telephone system, and the adjacent noise of film projectors, carousel slide machines and other equipment. At various points, a television camera on a mobile tripod was moved about to record some of the activity for future study and assessment. In some ways, the center had much of the superficial appearance of a "happening," but in spite of this, the work concentration and intensity level of the volunteers using the center remained at the maximum throughout the demonstration period.

In most instances, the volunteers went first of all to the computer terminal with some sort of health question in mind. As they gave their question to the operator, the latter typed in the key words contained in, or suggested by the question, and instructed the computer to search for the materials and sources in the centre relating to those key words. If, for example, the volunteer asked for information about the

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